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George Sheehan

RUNNING HEAD: Paradoxical Self-Perceptions

University of Alberta

Performance Miscalibration in Adolescents with Learning Disabilities: Domain-Specific or Generalized Trait?

by

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A thesis submitted to the Faculty of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Master of Education

in

Psychological Studies in Education

Department of Educational Psychology

Edmonton, Alberta

Fall 2008

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Your file Votre référence
ISBN: 978-0-494-47005-3
Our file Notre référence
ISBN: 978-0-494-47005-3

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Dedication

It is an honor for me to dedicate this Master's thesis to my parents, Gary and Terry, my brothers, Paul and Matthew, and my fiancé, Eric. Without your love, patience, understanding, and support, the completion of this work would not have been possible. I am so blessed to have you in my life.

Abstract

Previous research suggests that while the majority of normally achieving (NA) adolescents are moderately optimistic when rating their academic abilities, adolescents with learning disabilities (LD) tend to miscalibrate their performance by *overestimating* their capabilities (Alvarez & Adelman, 1986). However, it is not yet known whether this overconfidence is specific to academic contexts or a generalized trait that extends across domains (Klassen, 2007). Ninety-four adolescents (46 LD, 48 NA) participated in a study designed to explore the accuracy of calibration between perceived self-efficacy beliefs and task outcome across domains. Results revealed group differences in performance calibration across domains with LD adolescents showing an overestimation of ability on most tasks and NA adolescents demonstrating more precise self-appraisals. Additionally, the accuracy of non-academic performance predictions remained fairly stable with increasing difficulty in the NA group whereas the LD adolescents demonstrated a significant decrease in their ability to effectively predict their performance as the distance to the target increased.

Acknowledgements

To the outside observer, a Master's thesis may appear to be the culmination of a single person's efforts. However, to complete a project of this size necessitates a network of support, and I am indebted to numerous people. I am most grateful to my parents, Gary and Terry, for providing me with the guidance, opportunity, and encouragement necessary to realize my dreams. Your lives are testaments to what can be achieved through hard work, determination, perseverance, and commitment and I feel fortunate to have been a witness to your love for your children and for one another. To my brothers, Paul and Matthew, thank you for being such amazing supporters and friends. You are both wise beyond your years and I feel an overwhelming sense of pride whenever I think of the incredible young men you have become.

To Eric, my fiancé and best friend, I cannot express how appreciative I am for your love, patience, and support throughout this last year. You have shared in my stresses and successes and have been nothing short of amazing through the entire process. I love you and cannot wait to share my life with you.

Of immense importance as well is the exceptional leadership and direction of my supervisor, Dr. Robert Klassen, without whom the development and production of this research study and thesis would not have been possible. The opportunities and guidance you have afforded me have helped me to become a better researcher and student and have instilled in me a desire to improve my skills and knowledge further as you have shown me just how enjoyable and fulfilling research can be. I would also like to acknowledge the involvement of Dr. Judy Cameron and Dr. Linda Phillips who served on my oral

defense committee and challenged me to reflect on my work and think broadly about the implications of this study and its contribution to research in the areas of self-efficacy and learning disabilities.

During the past two years, I have also been blessed by developing several close friendships that I know I will carry throughout my life. In particular, there are two people who have become very dear to me and whom I consider to have had an influential part in the maintenance of my sanity and sense of humor throughout the demanding yet rewarding experience of completing a graduate program. Andrea and Jeff, your friendship, encouragement, and understanding are greatly appreciated. Without the laughs, late night tea sessions, and vibrant conversations, I know my appreciation for this process just wouldn't have been the same.

I truly believe that my accomplishments are only partially reflective of my abilities, work ethic, and motivation. Those responsible for the other part are my family, friends, supervisor, professors, and colleagues from whom I have gained the necessary knowledge, skills, support, and confidence to go out achieve my goals. My achievement is a direct reflection of your efforts, assistance, and support and it my great pleasure to share the successful completion of this work with you.

Last and most importantly, I would like to express the tremendous gratefulness I feel towards my loving savior, Jesus Christ, for being the greatest constant in my life and helping me to get to where I am today. I am truly appreciative for His guidance and blessings and credit Him immensely for His part in all of my accomplishments.

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Chapter 1

Introduction

"I was, on the whole, considerably discouraged by my school days. It was not pleasant to feel oneself so completely outclassed and left behind at the beginning of the race."
Winston Churchill, 1930.

Churchill's account is similar to the story of many adolescents living with learning disabilities (LD). At a time when school demands and social pressures are increasing, adolescents with LD display difficulty with the academic skills and confidence required to maintain the same pace towards independence as their peers (Fuhler, 1991). In addition to the physiological, educational, and psychosocial transitions experienced by all adolescents, those with LD have the added challenge of overcoming powerful learning deficits in specific domains (Klassen, 2002, 2006, 2007; Klassen & Lynch, 2007). *Learning disabilities* refer to a number of disorders that may affect the acquisition, organization, retention, understanding or use of verbal or nonverbal information. These disorders affect learning in approximately 5% of children aged 6 to 15 years who otherwise demonstrate at least average abilities essential for thinking and/or reasoning (Learning Disabilities Association of Canada [LDAC], 2002). As such, learning disabilities are distinct from global intellectual deficiency (LDAC, 2002) and are suggested by unexpected academic under-achievement or achievement that is maintained only by unusually high levels of effort and support (Klassen, 2006). Learning disabilities range in severity and may interfere with the acquisition and use of one or more of the following: oral language, reading, written expression and spelling, and mathematics.

In light of the scholastic difficulties faced by students with LD, it is not surprising that previous research has found that these students frequently display poor academic self-

concept, avoid work more often, use fewer self-help strategies, and hold low expectations of future success (Ayres, Cooley, & Dunn, 1990; Chapman, 1988; Fulk, Brigham, & Lohman, 1998). Indeed, it has generally been acknowledged that students with LD view their own academic skills as substantially weaker than those of their normally-achieving (NA) counterparts (Bryan, 1998; Fulk et al., 1998; Grolnick & Ryan, 1990; Lackaye, Margalit, Ziv, & Ziman, 2006; Licht, 1993; McPhail & Stone, 1995; Meltzer, Roditi, Houser, & Perlman, 1998; Stone & May, 2002). A common interpretation of this pattern is that these lower academic self-perceptions represent a realistic self-appraisal of educational performance (McPhail & Stone, 1995; Stone & May, 2002). However, there is an increasing body of evidence indicating that the academic self-perceptions of adolescents with LD may not be as balanced as was originally thought (Alvarez & Adelman, 1986; Graham, Schwartz, & MacArthur, 1993; Kruger & Dunning, 1999, 2002; Klassen, 2002, 2006, 2007; Klassen & Lynch, 2007; Meltzer et al., 1998; Pintrich, Anderman, & Klobucar, 1994; Stone, 1997; Stone & May, 2002). A paradoxical finding has surfaced in recent years that would suggest adolescents with LD hold generally optimistic beliefs about their ability to perform various academic tasks, even in the face of feedback that past performance was less than optimal (Klassen, 2002). While the majority of adolescents are moderately optimistic when rating their academic abilities, several researchers have found that adolescents with LD tend to miscalibrate their performance by *overestimating* their capabilities, despite evaluating their academic self-concept as lower than their NA peers (Alvarez & Adelman, 1986; Graham et al., 1993; Grolnick & Ryan, 1990; Klassen, 2002, 2006, 2007; Klassen & Lynch, 2007; Meltzer et al., 1998; Pintrich et al., 1994; Stone & May, 2002).

Optimistic Self-Efficacy

According to Bandura's (1986) social cognitive theory, how people behave can often be better predicted by the beliefs they hold about their own capabilities than by what they have accomplished in the past. These self-perceptions, referred to as self-efficacy beliefs, help determine individual action based on the knowledge and skills they possess to attain designated goals (Bandura, 1997; Zimmerman, 2000). This can be clearly seen in an academic context where students improve their performance in a subject despite receiving a low grade on an assignment. Instead of believing that the grade is a true reflection of all they can achieve, the students push themselves to achieve higher. Even in a subject where students are less capable, the level of their achievement is more dependent on how successful they *believe* they can be than on their actual capabilities as optimistic self-beliefs may motivate them to study harder, seek out help, and persevere longer. In fact, research has shown that optimistic self-efficacy beliefs greatly influence the choices individuals make, the amount of effort they devote to a task, their perseverance to complete a task when difficulties arise, the degree of stress they feel, and their level of achievement (Zeldin & Pajares, 2000). Such views of personal efficacy are often better predictors of behavior than prior achievements, skill, or knowledge (Bandura, 1997; Klassen, 2007; Pajares, 1996; Schunk, 1991; Zeldin & Pajares, 2000).

In academic contexts, optimistic efficacy beliefs are thought to be essential when adolescents approach novel tasks and are presented with new material (Klassen, 2007) as they serve to increase effort, motivation, and perseverance, and encourage achievement in challenging situations (Bandura, 1997; Klassen, 2007). However, there is a point at which optimism may be maladaptive, such as in the case of performance miscalibration of

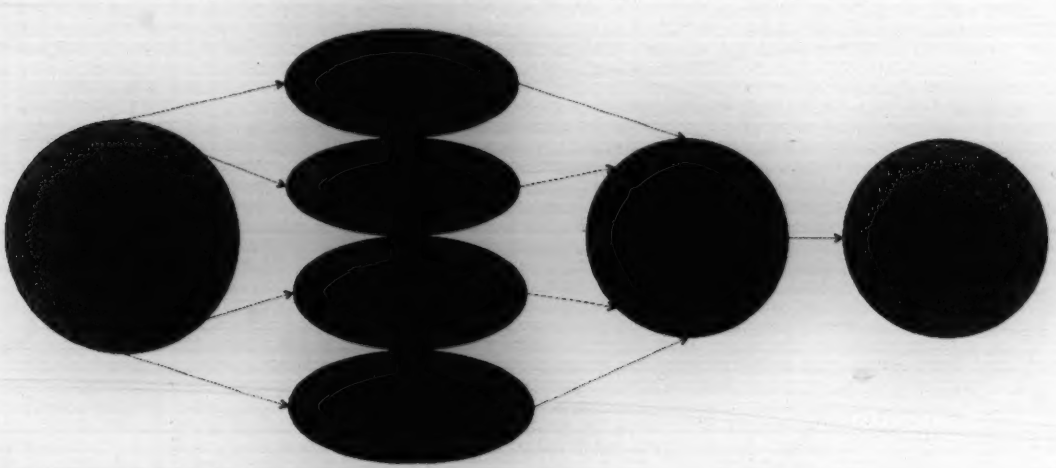
adolescents with LD. Students who are overly optimistic in their abilities tend to be less prepared, set inappropriate academic goals, exhibit poorer self-advocacy skills, and develop less effective self-help strategies (Klassen, 2002, 2007; Stone & May, 2002). This is maladaptive for adolescents with LD because effective self-advocacy, appropriate goal setting, and practical self-help techniques have been shown to be essential to their success (Stone & May, 2002). Without the proper acquisition of these skills, adolescents with LD are faced with even greater failure and frustration (see Figure 1).

The discrepancy between the experience of these negative feelings and subsequent perceptions of ability is surprising. Despite receiving poor performance feedback, students with LD have been shown to maintain overly optimistic beliefs of personal efficacy (Klassen, 2006; Klassen & Lynch, 2007, Stone & May, 2002). Due to the contradictory nature of this relationship, it seems logical to assume the presence of other factors that would move the student with LD from failure and frustration to over-optimism. Several suggestions have been put forth to explain this relationship, including faulty task analysis (Klassen, 2007) and deficient metacognitive awareness (Slife, Weiss, & Bell, 1985). It is not known, however, if the miscalibration of students with LD is restricted to academic domains or if miscalibration is also present in non-academic contexts.

Purpose of the Present Study

The aim of the present study is to explore the accuracy of calibration between perceived self-efficacy beliefs and task outcome (i.e., the accuracy of performance estimates compared to actual performance) for adolescents with and without LD on academic and non-academic tasks.

Figure 1. Model of the detrimental effects of overly optimistic self-efficacy beliefs



Previous research has shown that adolescents with LD may miscalibrate their performance by *overestimating* their capabilities (Alvarez & Adelman, 1986; Graham, MacArthur, Schwartz, & Page-Voth, 1992; Graham et al., 1993; Grolnick & Ryan, 1990; Klassen, 2002, 2006, 2007; Klassen & Lynch, 2007; Kruger & Dunning, 1999, 2002; Meltzer et al., 1998; Pintrich et al., 1994; Stone & May, 2002), but it is not yet known whether the overconfidence of students with LD is specific to academic contexts or a generalized trait that extends to non-academic domains. Thus, the current study investigates whether ability overestimation of adolescents with LD extends beyond the classroom to the non-academic realm. The study also investigates whether the performance calibration of adolescents with LD differs from that of their NA peers across domains.

Chapter 2

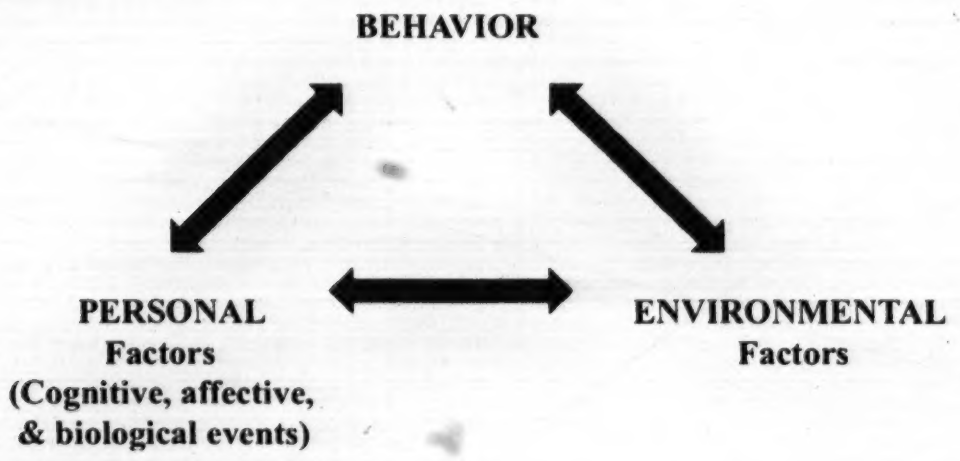
Review of the Literature

Social Cognitive Theory

Traditionally, psychological theories have emphasized learning through the effects of one's actions, such as is the case with psychodynamic theory (Freud, 1933), trait theory (Allport, 1961; Cattell, 1966), and radical behaviorism (Skinner, 1969). Over the years, however, humans have evolved a superior capacity for observational learning that is better suited for swift acquisition of competencies than is learning solely from consequences of trial and error (Bandura, 1986). From the social cognitive perspective, individuals are neither driven by inner forces nor automatically shaped and controlled by external stimuli, but rather human functioning is explained in terms of a model of triadic reciprocal causation in which personal, behavioral, and environmental influences all operate interactively as determinants of each other (Bandura, 1986) (see Figure 2). For example, how individuals interpret the results of their own behavior informs and alters their environments and the personal factors they possess which, in turn, influence and change subsequent behavior (Pajares, 2002).

The reciprocal nature of the determinants of human functioning in social cognitive theory makes it possible for therapeutic and counseling efforts to be directed at personal, environmental, or behavioral factors. Strategies for increasing well-being and self-confidence can be aimed at improving emotional, cognitive, or motivational processes, increasing behavioral competencies, or altering the social conditions under which people live and work (Bandura, 1986). In relation to the present study, it is well known that special education teachers have the challenge of improving the academic learning and

Figure 2. Schematization of the relationship between the three classes of determinants in triadic reciprocal causation.



confidence of their students with LD. Using social cognitive theory as a framework, these teachers can work to improve their students' emotional states and ameliorate their faulty self-beliefs and thinking processes (personal factors), improve their academic skills and self-regulatory practices (behavior), and alter the school and classroom structures that may undermine or hinder student success (environmental factors) (Pajares, 2002).

Self-Efficacy

Central to social cognitive theory, and of the utmost importance for human functioning, are self-efficacy beliefs, or "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391). Self-efficacy beliefs provide the foundation for human motivation, well-being, and personal accomplishment. It is held that unless people believe that their actions can produce the outcomes they desire, they have little motivation to act or to persevere in the face of difficulties and failure (Bandura, 1986, 1997; Pajares,

2002). With respect to the role of personal beliefs of efficacy in human functioning, Bandura (1997) contends, "people's level of motivation, affective states, and actions are based more on what they believe than on what is objectively true" (p. 2).

It has often been said that the difference between those who achieve success and those that do not is little more than hard work, sustained effort, and taking risks. Although it seems simple to attribute an individual's success to his/her work ethic or an unsuccessful individual's performance to a lack of effort, the majority of cases are not so straightforward. Instead, it has been suggested that a person's behavior can often be better predicted by the beliefs he/she holds about their capabilities than by what he/she is actually capable of accomplishing, for these self-efficacy perceptions help determine what individuals do with the knowledge and skills they have (Bandura, 1997; Pajares, 2002). This helps to explain why individuals behave in ways that are sometimes disconnected from their actual capabilities, such as in the case of performance miscalibration among adolescents with LD. As well, the strength of self-efficacy perceptions may also explain why the behavior of an adolescent with LD may differ so greatly from his/her NA counterparts even though they have been taught similar material and skills. The balance between belief and reality is rarely perfect and individuals are frequently guided by personal beliefs when they engage in the world around them. Such is the assumption that drives current self-efficacy research—that the self-beliefs of individuals form the very foundation of human agency and are key forces in their success or failure in all endeavors, especially in academic contexts (Pajares, 2002).

Academic self-efficacy. One of the first studies to investigate the influence of self-efficacy beliefs in an academic setting was conducted by Wood and Locke (1987). The

authors operationalized the concept of academic self-efficacy in the context of undergraduate studies by distinguishing a number of sub-domains (i.e., class concentration, memorization, exam concentration, understanding, explaining concepts, discriminating concepts, and note-taking) that together constituted this construct. A total of four studies were conducted to examine the relationship between academic self-efficacy and performance in college courses. Measures of academic grade goals (i.e., the grade *hoped* for in the test, the minimum grade the student would be *satisfied* with, the grade *expected*, and the grade the student would *actually try for*) and ability (i.e., Wonderlic Personnel Test (WPT); Wonderlic, 1939) were also obtained. Results demonstrated that when ability was controlled, academic self-efficacy clearly contributed to positive exam performance. It was also shown that greater academic self-efficacy led to the pursuit of higher personal goals, which in turn, allowed for better exam performance.

Replicating the studies of Wood and Locke (1987), Vrugt, Langereis, and Hoogstraten (1997) predicted that the academic self-efficacy and personal goals of psychology freshmen would contribute to exam performance. Although the findings supported this prediction, they were less robust than those of Wood and Locke (1987). In a second study, the authors predicted that self-efficacy appraisals, together with beliefs concerning the malleability of ability, would influence exam performance and the attribution of failure to lack of talent. Results indicated that participants who held high self-efficacy appraisals and strong malleability beliefs attributed failure less to lack of talent than those with low self-efficacy appraisals and weak malleability beliefs.

Klassen and Lynch (2007) were among the first to use a qualitative methodology to investigate the self-efficacy beliefs of early adolescents with LD. A series of focus

group interviews were conducted with 28 Grade 8 and 9 students with LD as well as individual interviews carried out with 7 specialist LD teachers. Content analyses of the student and teacher data resulted in 5 themes: self-efficacy, calibration and levels of self-efficacy, students' self-awareness, attributions for failure, and problems and solutions. Overall, students viewed themselves as low in self-efficacy and generally accurate in efficacy and performance calibration, whereas teachers viewed the students as overconfident about academic tasks. Additionally, students attributed their failures to lack of effort, whereas their teachers attributed student failure to uncontrollable learning deficits.

Findings from the above studies are in clear agreement with the suggestion that self-efficacy beliefs play a significant role in the academic performance of individuals with and without LD, separate from actual ability. While there is some disagreement about the attributions for failure between the studies, it does seem that the power of one's self-efficacy beliefs to predict academic performance is not in question. Vrugt and colleagues (1997) demonstrated that the strength of a person's efficacy beliefs may be such that they influence the attribution for failure to external factors rather than seeing the cause of difficulty and failure as within themselves (e.g., lack of skill or effort). Interestingly, Klassen and Lynch (2007) found that students with LD did not state that their low achievement in school was due to a lack of skill but rather a lack of effort, which supports the notion that positive self-perceptions are highly influential and can be a greater determinant of performance than actual ability.

Overestimation of efficacy. An interesting and unique explanation for the inclination of adolescents with LD to hold overly positive self-beliefs came out of an

investigation into the relationship between self-efficacy, self-concept, and expectancy success conducted by Alvarez and Adelman (1986). Nineteen students with LD and behavioral problems were administered several self-evaluation measures including the Piers-Harris Self-Concept Scale (Piers & Harris, 1969), three rating scales assessing self-efficacy (Bandura & Adams, 1977; Schunk, 1981), expectancy and aspiration of success (Adelman, 1969), and a self-protectiveness scale (Alvarez & Adelman, 1986). Due to the tendency of students with LD toward overly positive self-evaluative statements, the authors decided to shift their focus from the relationship between the above three variables and explore this phenomenon further. Previous research had demonstrated that low ability students have a tendency to be quite inaccurate in their estimates of performance (Covington & Beery, 1976; Covington & Omelich, 1979). Alvarez and Adelman (1986) decided to explore this miscalibration and proposed that students in their study were coping with poor academic performance by protecting their self-images through faulty calibration. Consistent with past investigations, the authors found that students' positive self-evaluations represented a selective tendency and were not due to an inability to make accurate self-judgments. The findings also support an interpretation of such overstatements as a form of self-protectiveness whereby students who feel threatened by perceptions of low ability can present a façade of competence in front of their peers.

Heath and Glen (2005) tested the hypothesis that overestimations of performance among children with LD would disappear following positive feedback. Twenty-three boys and 17 girls with LD, aged 10.6 to 13.5 years, and a control group of non-LD matched children (22 boys and 17 girls) provided a prediction of their performance prior to

completing a spelling test. Subsequently, they were randomly assigned to either a positive feedback or no feedback condition. After receiving feedback, the students were asked to provide a second prediction of performance on an equivalent spelling test. In children with LD, a positive bias in predictions of performance was found, however, following positive feedback, these predictions became accurate. Among non-LD children, no positive bias was displayed nor did feedback seem to have any effect on subsequent performance predictions. The results provide further support for the presence of a positive illusory bias and for the self-protective hypothesis in children with LD (Heath & Glen, 2005).

Generalizability of self-efficacy. Although self-efficacy has often been discussed in the literature as a domain-specific construct, several researchers suspect some generalizability of efficacy perceptions beyond a specific domain (Bandura, 1977; Schunk, 1991). Considering that efficacy formation is influenced by a person's cognitive appraisal of events, it seems plausible to assume generalized perceptions of efficacy across tasks or contexts depending on a person's subjective beliefs toward them. Specifically, perceived similarities of current tasks or contexts to those previously experienced are believed to form a cognitive basis for self-efficacy transfer (Bong, 1996).

To investigate the degree of and cognitive basis for the generalizability of self-efficacy, Bong (1996) recruited 588 high school students from the greater Los Angeles area to complete 42 problems representative of those normally seen in the following courses: English, Spanish, U.S. History, Algebra, Geometry, and Chemistry. Prior to each task, students rated their level of confidence in being able to effectively solve each problem. As well, students were asked to list two school subjects that they believed were

most similar to English and Algebra as a means of examining the relationship between similarity perception and self-efficacy generalization. Findings revealed that students' self-efficacy perceptions clearly generalized beyond boundaries of specific tasks and also of specific school subjects, albeit to a lesser degree. Greater generalizability of academic self-efficacy among math and science subjects was shown compared to verbal ones. As suggested, the degree of academic self-efficacy generalization partly depended upon the degree of perceived similarity among tasks. Students reported more comparable levels of self-efficacy as they perceived greater similarity in the set of problems presented.

Although conducted in an NA population, findings from the above study lend support for the hypothesis that perceptions of personal efficacy will influence performance in a non-academic setting. This suggests that the overestimation of ability seen among adolescents with LD in the academic realm may generalize across domains, resulting in performance miscalibration on non-academic tasks.

Motivation

According to Bandura's social cognitive theory (1986), student motivation is viewed as a construct that is built out of individual learning and personal experiences and varies greatly from one situation or context to the next. In support of this idea, a number of current investigations on the relationship between student motivation and academic performance are highlighting the concept of motivation as a multidimensional and situational construct (Volet, 2001). From this contextual perspective, researchers argue that the relevance and weight of motivational variables in relation to students' functioning vary depending on different dimensions related to individual, cultural, or situational characteristics (Bouffard & Couture, 2003). Bouffard and Couture (2003) examined this

supposition by comparing self-perceptions of competence, learning goals, and evaluations of usefulness of two school subjects (French and Mathematics) in 226 LD, high achieving [HA], and average achieving [AA] students. With respect to students' perceived competence, significant effects were found for school subject and for the interaction between school subject and group. Students in the accelerated group reported higher perceived competence than did those in both the delayed and regular groups. Examination of the interaction between school subject, gender, and group revealed that in mathematics, regardless of gender, students in the delayed group reported lower judgments of usefulness than did those in both the accelerated and regular groups. An evaluation of the learning goals of students on varying learning tracks indicated that in both subjects, students in the delayed group reported the highest work avoidance goals, used fewer metacognitive strategies, and were less willing to expend effort to study than were students in either of the two groups.

It is commonly acknowledged that the motivational difficulties of poorly achieving students are influenced by students' self-efficacy (e.g., Bandura, 1982; Schunk, 1985), perceptions of competence (e.g., Harter, 1992), and attributional beliefs (e.g., Weiner, 1979). These theories suggest that students who doubt their own competence and attribute failure to lack of ability are at a high risk for developing learned helplessness, which is a negative belief system that is likely to diminish students' expectations, efforts, self-help strategies, and problem solving abilities for academic activities (Licht & Kistner, 1986). However, theories related to student attributions and perceptions of personal efficacy or competence are only some of the many conceptual frameworks that contribute to our understanding of students' motivation. For instance, students' metacognitive

knowledge of task demands and learning strategies also impacts motivation in school (Borkowski, Johnson, & Reid, 1987).

To examine the effects of different sources of influence on the academic motivation of adolescents with and without learning and behavior problems, Fulk, Brigham, and Lohman (1998) administered the following questionnaires: (1) the Motivation Orientation Scale (Nicholls, 1989); (2) the Purposes of School Scale (Nicholls, 1989); and (3) the Motivated Strategies for Learning questionnaire (MSLQ; Pintrich & DeGroot, 1990) to three groups of adolescents (36 LD, 26 emotional and behavioral disorders (EBD), and 53 NA). Results revealed that students with LD appeared to be more alienated, avoided work more often, and held less positive views about school than did NA or EBD students. Additionally, students with EBD reported significantly more feelings of test anxiety than did their LD or NA counterparts. Gender differences were noted as well, with females reporting greater levels of self-sacrifice (i.e., doing things we have to even if we don't want to), community spirit (i.e., being useful to others), and persistence (i.e., not giving up when work gets hard) whereas male students reported more profound feelings of alienation.

Given the history of academic and social difficulty associated with LD, the findings of Fulk and colleagues (1998) are not surprising. Rather than expend greater effort in educational and social pursuits that in the past have resulted in failure and frustration, students with LD may find it easier to avoid the penalties in extra time and effort related to a learning disability and just accept the failing grade or negative social comparisons that are so familiar to them (Fulk et al., 1998).

Linking motivation and cognition. Present views of student learning suggest that

both motivation and cognition are important components of successful academic performance (Pintrich & DeGroot, 1990; Pintrich & Schrauben, 1992; Pintrich et al., 1994) as the integration of these components provides a much more detailed model of student learning. And yet, the literature on academic performance often follows a separation of these two factors, frequently focusing on how motivational beliefs lead to task choice and persistence without addressing what cognitive strategies are needed for the learner to accomplish his/her goals (Pintrich et al., 1994; Pintrich & Garcia, 1991).

Although research on the academic performance of at-risk students and students with LD has tended to follow the above separation, recent studies have begun to address both motivation and cognition in these populations (e.g., Borkowski, Carr, Rellinger, & Pressley, 1990; Carr, Borkowski, & Maxwell, 1991; Paris & Oka, 1986). To follow in this trend, Pintrich and colleagues (1994) examined several cognitive and motivational variables that distinguish children with LD ($N = 19$) from children without LD ($N = 20$). Although students with LD did exhibit lower levels of metacognitive knowledge and reading comprehension than their peers, no group differences emerged on subscales of intrinsic motivation, self-efficacy, or test anxiety. Additionally, they did not show any signs of learned helplessness, even though they did attribute success and failure to external causes more often than their NA counterparts. Using a cluster analysis that grouped individuals, the data revealed three distinct subgroups that cut across a priori categories of students with and without LD. The first group (mostly students with LD) was characterized by high levels of reading comprehension, intrinsic motivation, and metacognition. A second group (only students with LD) was distinguished by low levels of reading comprehension and metacognition, but high levels of intrinsic motivation.

Finally, a third group (split roughly equal between students with and without LD) was typified by low levels of intrinsic motivation and average levels of reading comprehension and metacognition. These clusters reveal that different patterns of motivation may be found within varying groups of students and that motivational patterns may be quite complex.

Current motivation research focuses much attention on individual beliefs of personal competence and the factors that enhance or hinder those self-beliefs. Successful completion of a task allows individuals to feel confident in their capability to achieve success in similar tasks in the future, especially if they believe their success is due to factors that operate within themselves, are easily controlled, and that the outcome of their actions is likely to occur again. As well, external sources of information can be incredibly instrumental in increasing or diminishing feelings of efficacy. The application value of the above theories is widespread. In the context of the classroom, the theories of self-efficacy and motivation provide insight into why students with and without LD think and behave the way they do, how they are affected by external influences, and to what they attribute their academic successes and failures. This knowledge allows for educators to focus their teaching on building student confidence, diminishing peer comparison, praising effort and perseverance, and tailoring the curriculum to ensure appropriate task difficulty depending on learning style and ability (Ring & Reetz, 2000).

Metacognition and Performance Calibration

Interest in self-efficacy in educational psychology is largely due to the perceived influential effect it has on performance. This impact is both positive, such as when NA students report greater self-confidence in their academic abilities than students with LD

(Boetsch, Green, & Pennington, 1996; Gans, Kenny, & Ghany, 2003; Renick & Harter, 1989), and negative, as evidenced by the development of learned helplessness by some students with LD in response to continued failure (Ayres, Cooley, & Dunn, 1990). However, there is an important difference between situations of justified confidence and feelings of overconfidence or underconfidence (Fogarty & Else, 2005), as the latter two states may lead to inappropriate evaluations of one's abilities, which in turn may have a detrimental effect on performance.

Calibration refers to the accuracy with which one can rate or predict his/her own performance (Fogarty & Else, 2005). In an academic setting, confidence calibration for declarative knowledge (i.e., knowing factual information) may be determined by comparing how well a student thinks he/she will do on a test (i.e., performance estimate) with his/her actual performance. For example, Graham and Harris (1989) measured the personal efficacy for essay writing of students with LD using a 10-point scale, where 10 = "not sure", 40 = "maybe", and 100 = "real sure". Ratings were made in response to a task description that specified essays must include a "good beginning, three reasons to support the premise, and a good ending" (p. 206). The influence of self-beliefs on performance was then assessed by comparing the mean efficacy ratings with task outcome. Although students demonstrated low essay writing skills, their performance estimates revealed a mean of close to 70 ("pretty sure"), thus showing an overestimation of writing ability compared to actual performance.

Similarly, in a 2007 study by Klassen, conventional self-efficacy measures and predictions of performance were used to examine the spelling and writing efficacy beliefs of early adolescents with and without LD. Results demonstrated that students with LD

overestimated their spelling performance by 52% and their writing performance by 19%, whereas the non-LD (NLD) students were generally accurate in their performance estimates. The students with LD rated themselves as lower in general self-efficacy than their NLD counterparts, but the mean item ratings of the students with LD suggested an optimistic perspective on problem-solving and general coping skills. Similarly, the ratings of efficacy for self-regulation of the students with LD were fairly optimistic, suggesting that these students perceived themselves as quite capable of self-regulatory tasks like planning and organizing schoolwork, and participating in class discussions. However, an examination of individual items on the self-regulation scale shows the students with LD lagged behind their NLD peers on finishing homework by deadlines, concentrating on school subjects, planning schoolwork, and motivation to complete school work.

The uniqueness of this study was in the use of performance predictions as a proxy for self-efficacy. It was determined that asking students to estimate how well they believe they will do on a certain task provides the researcher with an indication of how they view their capabilities (i.e., self-efficacy beliefs) and their perception of task difficulty. Klassen (2007) found that performance predictions were significantly correlated with conventional self-efficacy measures, lending support to the hypothesis that performance estimates can be used as a substitute for self-efficacy in the analysis of their influence on performance calibration in students with and without LD.

Accuracy in self-assessment. Being accurate in the estimation of one's abilities is essential for choosing education and career paths that are in line with one's talents and strengths. An individual who underestimates his/her abilities may have a lower likelihood of achieving a valuable goal by missing opportunities. Conversely, someone who

overestimates his/her capabilities may have similarly poor outcomes, in the sense that goals attempted are not achieved, or that the individual faces outright academic failure (Ackerman & Wolman, 2007). Given these possible outcomes, researchers Ackerman and Wolman (2007) designed an investigation geared at determining the accuracy of self-estimates of cognitive abilities. Self-estimates of verbal, mathematics, and spatial abilities were obtained prior to and after the administration of various objective ability tests (e.g., vocabulary, spatial orientation, and mathematics knowledge) in an effort to examine whether self-estimates change after the objective testing experience. Results showed some decline in stability from pretest to posttest assessments that were accompanied by changes in mean levels of self-estimates. Medium-to-large declines in self-estimates of abilities were found for mathematics and spatial abilities. However, the most significant deviation from expectations was that self-estimates of verbal abilities were the most positive, even after participants had completed the objective ability tests. It is suggested that the latter result may be due to individuals having a more robust (but not highly accurate) sense of their verbal abilities. In an effort to explain this finding, the authors hypothesized that individuals construct their verbal self-concept from their sense of interacting with others, which is consistent with the correlation between the trait complex that encompasses global self-efficacy and verbal self-estimates.

Metacognition and ability overestimation. Confidence calibration is part of a larger area of study known as metacognition, which is defined as the knowledge and experiences we have about our own cognitive processes (Flavell, 1979). Unlike cognitive strategies, which are used to make cognitive progress, metacognitive skills serve to *monitor* cognitive progress (Flavell, 1979; Loper, 1984). Planning the way to approach a

learning task, monitoring comprehension, and evaluating progress towards the completion of a task are all skills that are metacognitive in nature and are necessary for successful academic functioning (Flavell, 1976; Klassen, 2006). However, students with LD have been shown to struggle greatly with task analysis, selection and implementation of appropriate learning strategies, and performance monitoring and adjustment (Butler, 1998). Difficulties in reading, writing, and mathematics in students with LD are often due to the students' lack of metacognitive strategies necessary to plan, monitor, and evaluate their own behavior (Miranda, Villaescusa, & Vidal-Abarca, 1997). When compared to their NA peers, students with LD often rely on simpler less efficient strategies and fail to use the strategies they do have in a smooth and controlled manner (Mason, 2004). Instead of engaging in a thorough analysis of the task at hand, students with LD often focus on the concrete demands of the task, resulting in poorer performance (Klassen, 2002). Likened to the above, assessments of self-efficacy can be viewed as a function of metacognitive knowledge, as a conscious awareness of the self and task demands is necessary to accurately evaluate one's skills and performance (Butler, 1998; Klassen, 2006).

Findings from multiple studies by Kruger and Dunning (1999) have demonstrated that poor performers greatly overestimate their own performance, whereas high performers slightly underestimate theirs. The authors suggest that the reason for this lies in the fact that high performers develop metacognitive skills that enable them to understand their own abilities. In contrast, poor performers grossly overestimate their performances because their incompetence deprives them of the skills needed to recognize their deficits. Across four studies, Kruger and Dunning (1999) found that low-performing

participants grossly overestimated their test performance and ability. However, it was shown that improving the participants' metacognitive skills (i.e., the capacity to distinguish accuracy from error) helped them to recognize the limitations of their abilities and enhanced the accuracy of their self-appraisals.

An alternative account has been suggested to explain the pattern of over- and underestimation of performance observed by Kruger and Dunning (1999). Central to this account is the notion that both top and bottom performers have difficulty evaluating the quality of their performance—and it is this shared difficulty that accounts for the observed patterns of over- and underestimation of ability. Burson, Larrick, and Klayman (2006) investigated Kruger and Dunning's (1999) interpretation of over- and underestimation, focusing on comparative performance estimates in which people evaluated how well they performed relative to their peers. Burson and colleagues (2006) argued that if individuals produce similar appraisals (i.e., ones that are high for tasks perceived to be easy but low for tasks perceived to be difficult), what determines accuracy in performance estimation is less a matter of greater insight on the part of some individuals and more a matter of perceived difficulty. To support this claim, Burson and colleagues (2006) presented participants with tasks perceived to be difficult in three studies and found support for their assertions. Participants estimated how well they had performed on tasks that were designed to appear either easy or difficult. Across these studies, it was found that evaluations of performance did not correlate well with actual performance, but correlated significantly with difficulty. Upon completion of an easy task, participants of all skill levels estimated that they had done quite well relative to their peers, such that top performers looked fairly accurate and bottom performers were

significantly overconfident. However, after finishing a difficult task, participants of all skill levels estimated that they had performed quite poorly relative to their peers, making bottom performers look accurate and top performers significantly underconfident (Ehrlinger, Johnson, Banner, Dunning, & Kruger, 2008). Although Burson and colleagues (2006) focused their study on comparative and not absolute estimates of performance, they took their results as evidence that Kruger and Dunning's (1999) pattern of over- and underestimation of performance was simply a function of using seemingly easy or complex tasks and did not provide evidence of a relationship between skill level and accuracy in self-assessments (Ehrlinger et al., 2008).

Despite conflicting views, both Kruger and Dunning (1999) and Burson and colleagues (2006) put forth convincing arguments regarding the overestimation phenomenon among poorly achieving students. With the evidence attained in both studies, it is possible that lower achieving students, including those with LD, do suffer from deficits in metacognitive awareness that restrict them from being able to see the full limits of their capabilities. In addition, it seems plausible that task difficulty would play a role in performance miscalibration as it is frequently more challenging to judge how one will do on a hard task as opposed to an easy one. In order to examine these views, further investigation is needed to bring about understanding of the influential roles of metacognition and task difficulty in ability overestimation and performance miscalibration of students with LD.

Poor metacognitive awareness in students with LD. Stone and May (2002) examined the degree of overestimation of academic skills among high school students with LD as well as the role of the peer reference group and metacognitive awareness in

such overestimation. The reason that Stone and May (2002) included differential group referencing and metacognitive awareness in their study was that these two factors have been hypothesized to influence an adolescent's self-efficacy beliefs leading to an inflation of performance predictions (e.g., Renick & Harter, 1989). Prior to Stone and May (2002), the only direct assessment of the influence of poor metacognitive awareness on skill overestimation was conducted by Slife, Weiss, and Bell (1985). Although Slife and colleagues (1985) found evidence for significant overestimation of mathematics performance and poorer metacognitive awareness in students with LD, there was no evidence of greater overestimation in the sample relative to their NA peers. Thus, there was no clear evidence of a link between poor metacognitive awareness and enhanced overestimation.

Despite reporting significantly lower academic self-concepts, Stone and May (2002) found that students with LD overestimated their academic skills relative to others and their own test performance. Such overestimation was less pronounced among the students without LD. The findings with respect to the issue of differential reference groups were largely negative. All participants reported using similar reference groups (i.e., students in the same grade) in making their judgments. In contrast, the findings regarding metacognitive awareness provided some evidence that this second possible explanation may play a significant role in the overestimation phenomenon. Students with LD were significantly less accurate in judging their own success on the items in the vocabulary and mathematics tasks. These findings of lower sensitivity to the accuracy of one's own performance among students with LD are consistent with previous hypotheses.

Since research has demonstrated students with LD to have difficulty with metacognitive awareness (Stone & May, 2002), it seems logical that they would miscalibrate their efficacy beliefs and performance on various academic tasks (Klassen, 2006, 2007). Faulty task knowledge, lack of self-regulation, and inappropriate self-knowledge may all play a role in the development of inflated self-efficacy beliefs and performance miscalibration (Butler, 1999; Klassen, 2006, 2007; Meltzer et al., 1998). The extent to which this pattern of behavior in adolescents with LD extends to activities outside the academic domain remains to be seen; however, the apparent generalizability of the overconfidence effect across various domains and tasks, including eyewitness memory (Bornstein & Zickafoose, 1999), general knowledge tasks (Kleitman & Stankov, 2001), categorical judgment tasks (Schneider, 1995), and motor task performance (Gasser & Tan, 2005; West & Stanovich, 1997), has been shown among NA individuals, thus leading to the claim that this phenomenon is a pervasive cognitive bias rather than a domain-specific trait (Baron, 1994).

Performance miscalibration across domains. West and Stanovich (1997) assessed the domain specificity and generality of overconfidence among college students using two tasks in different domains: a knowledge assessment task (i.e., students answered 70 general knowledge questions with responses presented in a multiple choice format) and a game of motor skill (i.e., students attempted to slide pennies onto a colored strip at the end of a shuffleboard game table). Prior to finding out the results of their performance on the knowledge task, students were asked to rate their degree of confidence in their responses on a six-point scale from "just guessing" to "almost certain". A similar rating scheme was used for the penny slide task, although here students predicted their

performance prior to beginning each block of 30 trials. Results demonstrated a bias in overestimation of ability on both tasks. An analysis of individual differences indicated that there was substantial domain specificity in confidence evaluations. However, participants who persevered in demonstrating overconfidence in the motor task were significantly more overconfident in the knowledge assessment task, despite feedback revealing their overconfident performance predictions. The latter finding may be viewed as support for a mechanism with some degree of domain generality.

In a study by Gasser and Tan (2005), performance estimation and calibration for judgments made using procedural-oriented stimuli (i.e., throwing a dart at a target from three different distances) was evaluated among NA undergraduate students. A number of investigators, beginning with Lichtenstein and Fischhoff (1977), have found that on tasks of declarative knowledge participants show lower confidence for harder questions than easier ones, but a greater overconfidence effect. This means that calibration is poorer for harder questions than for easier questions. Although confidence estimates are decreasing with increasing difficulty, actual performance is decreasing at an even greater rate, creating the overconfidence effect. Given these results, Gasser and Tan (2005) purported that calibration should become poorer when the throw is made farther from the target due to an increasing level of relative overconfidence. Results demonstrated that the actual performance of the participants was much more variable than their estimates, with high correlations between the distance estimates from each of the three throwing positions and low correlations between the distance estimates and actual performance. These results indicate that participants may be forming their estimates of performance using a general schema that is only partially influenced by environmental factors, such as visual and

kinesthetic feedback and task difficulty based on distance from the target. This suggests that how well an individual believes he will do is a greater predictor of performance than actual skill or performance feedback.

Although results from the above studies seem to highlight the importance of positive efficacy beliefs on performance calibration across domains, the participant sample was restricted to NA undergraduates. Thus, it would be worthwhile to extend the findings of previous studies to junior high school students with and without LD in an effort to better understand the influence of an adolescent's self-efficacy beliefs on subsequent performance in different domains.

Self-Regulation

Self-regulation refers to the learners' ability to make adjustments in their own learning processes in response to their perception of feedback regarding their current status of learning. Self-regulation is made up of three components: self-observation (i.e., attending to specific aspects of one's own behaviors), self-judgment (i.e., comparing one's current progress toward a goal), and self-reaction (i.e., making evaluative responses to judgments of one's own performance) (Zimmerman, Bonner, & Kovach, 1996). The concept of self-regulation overlaps extensively with the notion of metacognition; its focus is on the ability of the learners themselves to monitor their own learning (without external stimuli or persuasion) and to maintain the attitudes necessary to invoke and employ these strategies on their own. To learn most effectively, students should not only understand what strategies are available and the purposes these strategies will serve, but also become capable of adequately selecting, employing, monitoring, and evaluating their use of these strategies (Graham & Harris, 1992; Reid & Harris, 1993).

The fact that almost all people are capable of self-regulation does not mean that all students actually do take effective charge of their own learning. Compared with students with LD, high achieving students report analyzing task requirements, setting more specific learning goals for themselves, using more strategies to learn, self-monitoring their learning progress more frequently, systematically adjusting their efforts based on learning outcomes and performance feedback from teachers, and using motivational strategies to keep themselves on task when they become discouraged or encounter difficulties (Zimmerman et al., 1996).

Factors mediating academic success. Learning strategies, motivation, and self-concept play critical roles in mediating educational success (Borkowski et al., 1990). Additionally important are students' understanding of their individual learning profiles, their recognition of the importance of effort in achieving success, and beliefs of personal efficacy (Bandura, 1997; McCombs, 1988; Meltzer et al., 1998; Pajares, 2002). Therefore, students' views of their own competence, their self-awareness, and their understanding of the unique demands of varying learning situations have tremendous influence on their ability to perform competently in the classroom (Meltzer et al., 1998). Research regarding general self-concept, academic self-concept, and self-awareness in students with LD has varied, with some investigations showing that students with LD display positive self-concepts and perceive themselves to be as equally competent as their NA peers (Renick & Harter, 1989), while others demonstrate that students with LD rate their academic abilities and achievement as lower than NA students, while still maintaining positive feelings of self-worth (Gans et al., 2003; Grolnick & Ryan, 1990; Licht, 1993). Additional studies suggest that students LD report lower academic and social self-efficacy, rate their mood

as more negative, show lower levels of hope, and invest less time and energy into their academic work (Lackaye et al., 2006).

In an effort to shed some light on this topic, Meltzer and colleagues (1998) conducted a study involving 663 students (308 LD and 355 NA), grades 4 to 9, and 57 general education teachers that focused on student and teacher perceptions of the students' strategy use and performance in nine different domains. Results demonstrated that students with LD considered themselves suitably strategic and competent in the five domains of reading, writing, spelling, mathematics, and organization. As well, these students rated their academic performance and organization as average to above average in seven of the nine domains, with the exception of checking and planning their work. In addition, the findings revealed a significant discrepancy between the self-assessments of students with LD and their teachers' evaluations. Teachers rated students as weak in strategy use and below average in their performance across all domains. These results lend support to the increasing body of research that suggests that students with LD frequently perceive themselves as capable in a variety of tasks and often rate themselves as academically stronger than their teachers judge them to be.

Summary

The accumulated research findings suggest that adolescents with LD can be confident about their abilities, but simultaneously unaware of their poor performance (Klassen, 2007; Kruger & Dunning, 1999, 2002). Based on the findings, the overconfidence of students with LD can be seen as expected as these students not only lack skills in academic areas, but may also be relatively ignorant of their skill deficits (Klassen, 2007). However, what remains to be investigated is whether this same

imbalance between self-efficacy beliefs and performance exists across domains for students with LD.

Chapter 3

Methodology

Research Questions and Hypotheses

The goal of the present study is to extend the results of previous researchers in an LD population (Gasser & Tan, 2005; West & Stanovich, 1997). More specifically, the following questions are addressed: (a) Do adolescents with LD overestimate their performance on academic tasks as has been demonstrated in the literature? (b) Is performance miscalibration in adolescents with LD domain-specific or a more generalized trait that exists across domains? and (c) Are there differences between the self-efficacy beliefs and performance calibration of adolescents with LD compared to their NA peers across domains?

Based on findings from past research, it was suggested that the adolescents with LD in the present study would show patterns of overestimation on reading, spelling, and writing tasks similar to past students with comparable learning deficits.

Second, it was hypothesized that performance miscalibration would be a generalized trait. In conjunction with this supposition, it was further purported that learning to accurately view one's capabilities in one domain will transfer to other domains and increase task success.

Third, it was predicted that differences in the self-efficacy beliefs and performance calibration of adolescents with and without LD would arise in both academic and non-academic settings, with significant overestimation of abilities among adolescents with LD and more balanced performance calibration among NA students.

Method

Participants

Forty-six adolescents with LD (11 female, 35 male) and forty-eight NA controls (21 female, 27 male) were recruited from three junior high schools that offered the Strategies program in the Edmonton area (i.e., Academy at King Edward [School A], D.S. MacKenzie [School B], and Dan Knott [School C]). The Strategies program is designed to provide students coded as LD with the learning strategies and academic skills necessary to one day function in regular classroom settings without the need for special programs. All students in the Strategies program had been assessed by a qualified professional (registered school or clinical psychologist) and had met provincial LD criteria, which stipulate a significant discrepancy (i.e., 2+ standards deviations) between intellectual ability and achievement in reading, mathematics, and/or written expression.

Whereas adolescents in the Strategies program were recruited from all schools (35 from School A, 6 from School B, and 7 from School C), NA participants were recruited solely from Schools B (33) and C (32) as School A only provides programming for students with LD. The distribution of students across grades was as follows: Grade 7, 34 LD, 12 NA; Grade 8, 9 LD, 30 NA; Grade 9, 3 LD, 6 NA, and the mean age across groups was 13.05 years. Upon project approval from the University of Alberta and the Edmonton Public School Board (EPSB), an extensive research proposal was sent to the principals of each school via email outlining the purpose of the study, student involvement, estimated time commitment, and benefit for the school and students (see Appendix A) as well as a letter informing teachers of the project (Appendix B). To determine an appropriate data collection schedule, meetings were held with each principal

asked to rate his/her level of confidence of correctly completing between 30-100% of the task items. Ratings were made on a 10-point scale from "Cannot do at all" to "Certainly can do". As well, students were asked to make a prediction as to how many sentences they believed they could read and judge accurately given the amount of time designated for the task and their perception of their abilities. Students were provided with the following three examples to allow for more accurate self-evaluations:

1. Elephants are small animals..... T F
2. A scientist may work in a laboratory..... T F
3. A bag filled with feathers would be very light..... T F

Spelling task. The second task consisted of spelling thirty words of medium difficulty based on the students' grade and learning levels (see Appendix F). Students completed self-efficacy ratings and predictions according to how many words they believed they would spell correctly given their perception of their spelling abilities and vocabulary knowledge. Unlike the reading task, the spelling exercise was not timed, although students were encouraged to complete each item after hearing the word read aloud three times by the examiner. Students were provided with the following statement in writing prior to making their self-appraisals:

> *Now, I'm going to ask you to spell 30 words of medium difficulty for your grade level. For example, I might ask you to spell words like cucumber, hornet, or lightning.*

Writing task. In the third task, students were requested to write short, complete sentences out of three words in five minutes (see Appendix G). Similar to the first two tasks, ratings of personal efficacy and a prediction of performance were collected. In addition to being provided with the following examples, the researcher explained that all

words presented must be used as written, as variations would not be accepted (e.g., *give* cannot be changed to *gives*, *given*, or *gave*):

Example: *large, dog, barks*
You could write: *The large dog barks.*

Example: *apples, picked, tree*
You could write: *I picked apples from the tree.*

Academic tasks and self-efficacy rating scales used in this study were adapted from the work of Klassen (2007), which demonstrated their effectiveness in achieving accurate estimates of performance calibration and self-efficacy beliefs in adolescents with and without LD.

Throwing task. The non-academic task consisted of throwing a ball at a target from three different distances (i.e., 2m, 3m, and 4m). Again, students were asked to rate their level of confidence of hitting the target on each of their throws at each of the distances (i.e., 1st, 2nd, 3rd throw at **2m**, 1st, 2nd, 3rd throw at **3m**, and 1st, 2nd, 3rd throw at **4m**) prior to beginning the task as well as make a prediction about their performance at each of the distances (e.g. "I believe I can hit the target ___ out of 3 throws at a distance of **2m**") (see Appendix H).

Procedure

The academic tasks were administered to groups of about 10-15 students, taking approximately 45 minutes per group. At Schools A and C, LD and NA students were tested separately, whereas groups at School B consisted of a random mix of students with and without LD. Sessions began with completion of the participant consent form (see Appendix D), which was read aloud by the researcher as the students followed along. Upon provision of consent, students were provided with the three academic tasks (i.e., reading, spelling, and writing). Each task was distributed in paper format and collected

immediately after the time limit was met (reading and writing) or the majority had finished spelling the final word (spelling). Before completing each task, the students were asked to fill in the self-efficacy rating scale as well as make a prediction as to how many items they believe they would correctly complete. Students were informed that no one would see their ratings nor their actual scores and that predictions were to be made according to their perceptions of their own abilities and the nature of the task at hand. The researcher instructed the students how to complete the self-efficacy rating scale prior to beginning the academic tasks to ensure that the students understood the relationship between number of correct responses and percentage out of 100 (e.g., 9 correct responses out of 30 items is roughly equivalent to 30% out of 100). This rating scale was chosen to maintain consistency between the tasks despite altering the number of items within each task.

Administration of the non-academic task was conducted individually in an effort to eliminate the effects of peer comparison. In Schools A and B, administration occurred during school hours with each student leaving class for approximately 5 minutes. At School C, students were required to sign up to complete the non-academic component of the research project after school at the request of the principal to avoid numerous disruptions. Prior to the students' arrival, the researcher measured the distances, marking each to facilitate a smooth transition from one distance to the next. At each distance, students were given one practice throw and three test throws. In an effort to achieve accurate prediction of performance, the researcher asked each student to stand at the start line while she moved from the closest to the furthest mark to help the students visualize the distances and the increasing difficulty of the task. Similar to the academic tasks, a

measure of the students' efficacy was completed prior to beginning the task as well as a prediction of performance at each of the three distances. Students were provided with verbal instructions in tandem with a demonstration outlining how the task was to be performed. The researcher reminded the students how many throws were remaining at each distance and that their first throw would not be counted in their actual score as it was to be used for practice. The researcher recorded the students' performance by placing a check mark next to the successful throws at each distance prior to moving the target to its next location.

Chapter 4

Results

Presentation of the data is organized in the following manner: (a) statistical assumptions, (b) results associated with the students' self-efficacy ratings and prediction scores, and (c) findings related to performance calibration across domains. The data collected from the academic and non-academic tasks were submitted to three types of analyses using the SPSS 16.0 statistical software package: mean comparisons, Pearson correlations (two-tailed), independent samples t-tests (two-tailed), and repeated measures analysis of variance (ANOVA).

Statistical Assumptions

The following statistical assumptions are put forth for a two-sample t-test: (a) the data must be sampled from normally distributed populations; (b) the two populations must have equal variances (i.e., homogeneity of variance); (c) each score (or difference score for the paired t-test) must be independent of all other scores.

It was determined that the present study meets the requirements for the assumptions outlined above. Homogeneity of variance was not considered to be a factor due to the equal sample sizes among the groups (Glass, Peckham, & Sanders, 1972).

Performance Prediction as a Proxy for Self-Efficacy

For each task, performance prediction was used as a substitute for judgments of self-efficacy (see Klassen, 2007). Recall that two forms of self-efficacy measurement were used to evaluate students' personal beliefs of their own capabilities (self-efficacy ratings and performance prediction scores). To establish the validity of the association

between self-efficacy ratings and performance prediction scores, correlations were conducted comparing these two variables between groups (see Table 1).

In the academic domain, moderate to high correlations were found between each of the efficacy ratings and performance prediction scores in both groups, with somewhat more robust correlations revealed in the NA group. For example, in the LD group, self-efficacy for reading correlated moderately with performance prediction scores in reading ($r = .68, p < .01$). Similar correlations were revealed for spelling ($r = .66, p < .01$) and writing ($r = .67, p < .01$). In the NA group, similar outcomes were achieved among comparisons of reading, spelling, and writing efficacy and performance prediction scores. Analyses revealed strong correlations between measures of reading and spelling efficacy and their associated performance prediction scores (i.e., $r = .74, p < .01$ and $r = .78, p < .01$, respectively), with a slightly higher association found between writing efficacy and prediction of writing ability ($r = .82, p < .01$).

In the non-academic domain, self-efficacy for throwing among adolescents with LD was moderately associated with performance prediction in throwing ($r = .59, p < .01$). In the NA group, a slightly higher correlation was demonstrated between these variables ($r = .80, p < .01$).

Also included in the correlation matrix, detailed in Table 1, are the associations between the two measures of self-efficacy and actual performance on each of the given tasks across groups. Moderate correlations between self-efficacy and actual performance for spelling were revealed in both LD and NA adolescents ($r = .53, p < .01$ and $r = .36, p < .05$, respectively). Similar outcomes were observed with respect to the relationship

Table 1

Intercorrelations Between Measures of Self-Efficacy and Actual Performance on Academic and Non-Academic Tasks Across Groups

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1 Reading efficacy	1	.68**	.05	.59**	.40**	.30*	.50**	.43**	-.01	.03	-.08	.02
2 Reading prediction	.74**	1	.20	.57**	.44**	.49**	.39**	.44**	-.02	-.03	.05	.18
3 Reading performance	-.16	-.06	1	.02	-.13	.29	.11	.14	.38**	.04	.08	-.13
4 Spelling efficacy	.65**	.57**	-.10	1	.66**	.53**	.63**	.57**	.09	-.08	-.05	.03
5 Spelling prediction	.51**	.61**	-.15	.78**	1	.61**	.38**	.46**	.20	-.12	.00	.07
6 Spelling performance	.04	.08	-.04	.36*	.37**	1	.48**	.49**	.32*	-.08	-.07	.03
7 Writing efficacy	.82**	.65**	-.06	.74**	.63**	.12	1	.67**	.03	.18	.08	.02
8 Writing prediction	.66**	.68**	-.09	.63**	.73**	.19	.82**	1	.14	.03	.17	.16
9 Writing performance	-.27	-.28	.23	-.18	-.14	.24	-.16	-.21	1	-.08	-.17	-.25
10 Throwing efficacy	.29*	.24	.08	.10	.01	-.31*	.30*	.18	-.07	1	.59**	.04
11 Throwing prediction	.16	.26	.08	.01	.06	-.37**	.17	.22	-.11	.80**	1	.27
12 Throwing performance	-.01	.00	.34*	-.16	-.08	-.19	-.12	-.06	-.03	.24	.35*	1

*$p < .05$. **$p < .01$. Data for the LD group are displayed above the diagonal while data for the NA group are displayed below the diagonal.

between performance prediction and actual performance for spelling where a slightly more modest correlation was found among NA students ($r = .37, p < .01$) compared to students with LD ($r = .61, p < .01$). In both the reading and writing tasks, actual performance did not correlate with either of the measures of self-efficacy. A review of the correlation data for the throwing task revealed results comparable to the academic domain. The only correlation demonstrated to be significant was that of throwing prediction and actual performance among NA adolescents ($r = .35, p < .05$).

Self-Efficacy Ratings

Table 2 presents self-efficacy ratings for each domain across the two groups. Mean comparisons and independent samples *t*-tests were performed contrasting the self-efficacy scores of LD and NA adolescents by task, with the alpha level set at .05. To determine the effect size of each *t*-test, the following descriptors were used as defined by Cohen (1988): small ($d = .2$), medium ($d = .5$), and large ($d = .8$). Significant differences were revealed for all three academic tasks but not for the non-academic task, with higher efficacy ratings found among the NA students. On the reading task, adolescents with LD demonstrated lower confidence in their ability to read and correctly judge the 60 sentences within the three-minute time limit ($M = 56.07, SD = 15.33$) compared to their NA peers ($M = 68.17, SD = 11.58, t = -4.33, p < .001, d = -.89$). Similar differences were shown on the spelling task, with adolescents with LD displaying significantly lower self-efficacy beliefs ($M = 54.87, SD = 18.80$) than their NA counterparts ($M = 69.17, SD = 11.74, t = -4.44, p < .001, d = -.91$). Consistent with the previous two tasks, the writing efficacy judgments of students with LD ($M = 52.91, SD = 17.16$) were well below those of the NA students ($M = 66.48, SD = 12.45, t = -4.40, p < .001, d = -.91$), demonstrating a

Table 2

Independent Samples t-tests for Student Ratings of Self-Efficacy on Academic and Non-Academic Tasks

Source	Mean		*t*	*df*	Sig. (2-tailed)	*d*
	LD ($N = 46$)	NA ($N = 48$)				
Reading efficacy	56.06 (15.33)	68.17 (11.59)	-4.32**	92	.000	-.89
Spelling efficacy	54.87 (18.80)	69.17 (11.74)	-4.44**	92	.000	-.91
Writing efficacy	52.91 (17.16)	66.48 (12.45)	-4.40**	92	.000	-.91
Throwing efficacy	60.87 (18.97)	66.35 (20.29)	-1.35	92	.180	-.28

**$p < .001$. Standard deviations appear in parentheses below means.

pattern comparable to the findings of past researchers who report that students with LD hold lower self-beliefs of personal competence on academic tasks than those without learning deficits (Lackaye et al., 2006; Meltzer et al., 1998; Stone & May, 2002).

Self-efficacy ratings for the non-academic task followed the same pattern as above, but with less discrepancy between the groups. The adolescents with LD reported greater confidence in their ability to hit the target ($M = 60.87$, $SD = 18.97$) compared to any of the academic tasks, but were still slightly less confident than their NA peers ($M = 66.35$, $SD = 20.29$, $t = -1.35$, $p = .180$, $d = -.28$).

Prediction Scores and Calibration

Academic Tasks. The calibration of performance across groups was examined by calculating the difference between performance prediction and actual performance (i.e., actual score – predicted score) across groups (see Table 3). Comparisons revealed significant differences between students with LD and their NA counterparts for reading ($t = 2.83$, $p < .01$, $d = .58$) and spelling ($t = 8.23$, $p < .001$, $d = 1.70$) but not for writing ($t = .43$, $p = .668$, $d = .09$). While the LD group showed a mix of underestimation (i.e., Reading = -.80 items) and overestimation (i.e., Spelling = 6.26 items) of ability, the NA group displayed significant underestimation in both reading and spelling (i.e., -7.69 and -2.63 items, respectively). Gross overestimation of writing ability was found in both groups (i.e., LD = 9.11 items and NA = 8.52 items), thus yielding non-significant group differences.

Non-Academic Task. Extending the findings of previous researchers (Klassen, 2007), the present study investigates whether the phenomenon of performance miscalibration in adolescents with LD occurs across domains. A comparison of the

Table 3

Mean Scores, Standard Deviations, and Independent Samples t-tests for Performance Calibration Across Domains

Source	Mean Score LD ($N = 46$)	NA ($N = 48$)	t	df	Sig. (2-tailed)	d
Reading prediction	36.67 (12.00)	46.96 (8.35)	-4.84**	92	.000	-.99
Reading performance	37.47 (8.58)	54.65 (5.19)	-11.79**	92	.000	-2.42
Reading calibration	-.80 (13.28)	-7.69 (10.11)	2.84*	92	.006	.58
Spelling prediction	19.13 (6.60)	22.85 (5.40)	-3.00**	92	.003	-.62
Spelling performance	12.87 (5.39)	25.47 (2.79)	-14.32**	92	.000	-2.94
Spelling calibration	6.26 (5.38)	-2.62 (5.08)	8.23**	92	.000	1.70
Writing prediction	16.96 (5.90)	21.08 (5.75)	-3.44*	92	.001	-.71
Writing performance	7.85 (3.00)	12.57 (2.92)	-7.71**	92	.000	-1.59
Writing calibration	9.11 (6.24)	8.81 (6.98)	.43	92	.668	.09
Throwing prediction	5.93 (1.44)	5.45 (1.75)	1.44	92	.153	.29
Throwing performance	3.35 (1.54)	4.06 (1.48)	-2.30*	92	.024	-.47
Throwing calibration	2.58 (1.80)	1.39 (1.85)	3.16*	92	.002	.65

* $p < .05$. ** $p < .01$. Standard deviations appear in parentheses below means.

significant differences between adolescents with LD and those without (i.e., $t = 3.16$, $p < .01$, $d = .65$). Although both groups overestimated their performance on this task, the adolescents with LD did so to a much greater extent than the NA students (i.e., 2.58 compared to 1.39 throws, respectively). Findings are consistent with the hypothesis that the overestimation of ability in adolescents with LD occurs across domains, thus lending support to the argument that this phenomenon results from a pervasive metacognitive bias (Fogarty & Else, 2005).

Task Difficulty and Calibration

In order to further investigate the prediction-performance miscalibration of the throwing task, the differences in miscalibration from one distance to the next (or the influence of task difficulty on performance calibration) were explored across groups. Recall that Gasser and Tan (2005) examined the effect of task difficulty on motor performance calibration and found that the actual performance of students was much more variable than their estimates, with high correlations between the distance estimates across three throwing positions and low correlations between the distance estimates and actual performance. Table 4 reports throwing performance calibration (i.e., difference scores between performance prediction and actual performance) between groups with distance (2m vs. 3m vs. 4m) as the within-subjects factor. The main effect of distance was significant (i.e., $F(1, 92) = 111.79$, $p < .001$) as was the main effect of group (i.e., $F(1, 92) = 11.11$, $p < .01$). However, the interaction of distance X group was not found to be significant (i.e., $F(1, 92) = 2.20$, $p = .142$).

The results show similar outcomes between LD and NA adolescents with respect to the effects of distance and group on performance calibration, meaning that significant

Table 4

Repeated Measures Analysis of Variance of the Main Effects and Interaction of Distance and Group

Source	*df*	Mean Square	*F*	*p*
Distance (D)	2	4.91	5.84*	.018
Group (G)	1	11.11	9.99*	.002
D X G	2	1.85	2.20	.142
Error	92	.84		

* $p < .05$. ** $p < .001$.

differences among the data were achieved across distances and between groups. Due to these similarities, it was found that the interaction between distance and group was non-significant.

In Table 5, mean scores of performance prediction, actual performance, and calibration are presented between groups and across throwing distances in order to evaluate performance calibration at each level of distance and to determine the influence of task difficulty on performance prediction. Additionally, statistical comparison of the difference in calibration at each level was conducted using independent samples *t*-tests between the groups. Comparisons of performance calibration across distance revealed significant differences between groups, with adolescents with LD demonstrating a significant decrease in their ability to effectively predict their performance as the distance to the target increased. The most substantial difference appeared between 2 and 3 meters whereby adolescents with LD went from overestimating their performance by .52 throws ($SD = .94$) to 1.02 throws ($SD = .93$). From 3 to 4 meters, overestimation was increased by only .2 throws ($M = 1.04$, $SD = .92$). In contrast, NA adolescents were quite balanced in their calibration, showing slight but consistent overestimation across distances (i.e., .39, .48, and .52 throws at 2, 3, and 4 meters, respectively).

Independent samples *t*-tests revealed significant differences between the groups at both 3 ($t = 3.08$, $p < .01$, $d = .63$) and 4 meters ($t = 2.65$, $p < .01$, $d = .54$), but not at 2 meters ($t = .64$, $p = .52$, $d = .14$). These findings imply that task difficulty plays a role in the performance calibration of adolescents with LD, with greater difficulty having a detrimental effect on the ability of these students to appropriately judge their performance.

Table 5

Mean Scores, Standard Deviations, and Independent Samples t-tests for Non-Academic Performance Calibration Across Distances

Source	Mean Score LD ($N = 46$)	NA ($N = 48$)	*t*	*df*	Sig. (2-tailed)	*d*
Prediction score at 2m	2.35 (.60)	2.35 (.67)	.05	92	.962	.00
Actual score at 2m	1.83 (.82)	1.96 (.85)	.77	92	.446	-.16
Calibration score at 2m	.52 (.94)	.39 (.96)	.64	92	.522	.14
Prediction score at 3m	1.98 (.54)	1.85 (.65)	1.01	92	.318	.22
Actual score at 3m	.96 (.76)	1.37 (.82)	2.57*	92	.012	-.52
Calibration score at 3m	1.02 (.93)	.48 (.77)	3.08**	92	.003	.63
Prediction score at 4m	1.61 (.65)	1.25 (.67)	2.64**	92	.010	.55
Actual score at 4m	.57 (.75)	.73 (.71)	1.09	92	.278	-.22
Calibration score at 4m	1.04 (.92)	.52 (.99)	2.65**	92	.009	.54

* $p < .05$. ** $p < .01$. Standard deviations appear in parentheses below means.

Chapter 5

Discussion

The current study builds on the research of previous self-efficacy investigators who have sought to examine the role of self-efficacy beliefs on performance calibration among students with LD. In an academic context, it has been well established that students with LD perceive their abilities to be greater than they actually are, thus leading to inflated beliefs of personal efficacy, despite performance feedback that suggests significant academic difficulties (Alvarez & Adelman, 1986; Graham et al., 1993; Grolnick & Ryan, 1990; Klassen, 2002, 2007; Klassen & Lynch, 2007).

Academic Performance Calibration

Results from this study support previous research showing that performance predictions are significantly correlated with traditional measures of personal efficacy on academic tasks and extends past research by demonstrating similar correlation with non-academic tasks. In the academic domain, adolescents with LD displayed lower feelings of personal efficacy than their NA counterparts, but were significantly more optimistic (relative to their actual performance) in all tasks administered with the exception of reading. Students with LD significantly overestimated their performance in spelling and writing by 6.26 and 9.11 items, respectively. In reading, students with LD were more accurate in their appraisals, slightly underestimating performance by -.80 items. Although some researchers have proposed that modest overconfidence promotes achievement and positive feelings of self-worth (Bandura, 1997; Meltzer et al., 1998; Taylor & Brown, 1994), the optimistic efficacy exhibited by students with LD in this study typically led to poor performance calibration and may reflect a lack of awareness of personal capabilities,

task demands, and task difficulty (Klassen, 2007). A review of the performance data of NA participants revealed significant underestimation of reading and spelling ability (i.e., -7.69 and -2.62 items, respectively), and an overestimation in writing by 8.81 items.

It has been suggested that the variability in performance calibration across academic subject areas may be due to differences in difficulty among tasks (e.g., Gasser & Tan, 2005). It is believed that the reading results in both groups may have been more robust had completion of the task been limited to two minutes as many students completed all items during the final minute provided, thus creating a ceiling effect.

Overestimation of writing performance may be due to a lack of familiarity estimating writing performance as this academic skill is rarely assessed in the manner used in the present study. Also, many students commented that while their minds were already constructing the next sentence in the series, there was a delay in how quickly they could write the previous sentence. This delay between their thoughts and motor skills was seen as a hindrance to being able to complete as many items as they believed they could have given the amount of time provided.

Support for these arguments can be seen in the weak correlations revealed between measures of self-efficacy and actual performance on tasks of reading and writing among both LD and NA adolescents. It is hypothesized that the lack of familiarity with these tasks may have created greater problems for students in terms of accurately calibrating their efficacy and performance, in comparison to spelling, which is more predictable and evaluated in the classroom in ways similar to the present study.

Non-Academic Performance Calibration

In support of the second hypothesis, which stated that performance miscalibration would be observed among adolescents with LD across domains, overestimation of ability was found on both academic and non-academic tasks. Miscalibration of motor skill was demonstrated using a simple throwing task whereby students had to assess their ability to accurately hit a target from three different distances. Overall, students with LD overestimated their performance by 2.58 items, while their NA peers showed considerably less discrepancy (1.39 items). Although it is believed that the novelty of this task and assessment of performance at all three distances with little practice may have contributed to the difficulty students experienced in effectively predicting their performance, the results are supported by the findings of previous researchers with NA participants (e.g., Gasser & Tan, 2005).

These findings are especially important as they lend support to the argument that students with LD suffer from a pervasive metacognitive bias that prevents them from accurately assessing their performance despite negative feedback (e.g., failing grades). Kruger and Dunning (1999) suggest that lower ability students may not only lack the skills to complete certain tasks, but also the metacognitive awareness to judge their performance effectively. They argue that the skills required to succeed in a domain are the same skills required to evaluate competence in that domain. Thus, people who lack skill and understanding in a domain suffer from a "dual burden;" they are unskilled and lack the metacognitive ability to recognize their own lack of skill (Kruger & Dunning, 1999, 2002). Although students with LD understand the feedback received, as shown by their frustration with poor outcomes on tests and projects, it seems that they have

difficulty translating that feedback into increased preparedness, greater use of metacognitive strategies, and more accurate self-appraisals of ability and performance.

Influence of Task Difficulty on Performance Calibration

In the current study, an analysis of the effect of distance on a student's ability to accurately judge his/her performance revealed significant differences in performance predictions from one distance to the next. These results are consistent with results from the study by Gasser and Tan (2005) and suggest that participants may be forming performance estimates based on a general schema of beliefs about expected performance, with minimal reliance on visual and kinesthetic feedback and task difficulty based on distance from the target. In the present study, it was found that as the distance between the target and the throwing line increased, students with LD became less accurate in their self-appraisals. In other words, enhancing task difficulty diminished the ability of students with LD to effectively calibrate their performance. These findings not only support the view that adolescents with LD experience notable difficulty in making accurate assessments of performance but point to further problems with respect to the effective evaluation of task demands and shifting of metacognitive strategies to correspond with differing levels of task difficulty.

Although NA students displayed some difficulty in their ability to accurately predict their performance on the ball toss task, their degree of overestimation was considerably less than that of the LD group. At the closest distance, performance was overestimated by .39 throws and increased only slightly at each subsequent distance (i.e., .48 and .52 at 3 and 4 meters, respectively). This demonstrates the capability of NA students to effectively assess task demands and difficulty and adjust behavior

accordingly, allowing for better calibration of performance and greater congruence between self-efficacy beliefs and performance outcome.

Limitations

A number of methodological issues arise when conducting research on the self-perceptions of students with LD. Many variables that may affect the results are difficult to control. Socioeconomic status, family variables (e.g., home environment), and the adolescent's relationship with his/her teachers and peers may all contribute to the adolescent's self-concept and view of his/her abilities (Gans et al., 2003). Additional limitations include the lack of geographical and cultural representativeness of participants with LD since students were selected from junior high schools in the Edmonton area and in close proximity to one another. In addition, most of the participants were of European or North American descent. Thus, the results are generalizable only to other schools with similar populations. Also, students with LD were not separated into different groups by type of learning disability (i.e., reading, written expression, and mathematics) since this information was not available to the researcher. However, it is estimated that approximately 80% of students with LD are initially classified as having a learning disability due to problems in reading (LD OnLine, 2008).

Participants' lack of familiarity with the academic and non-academic tasks might also be seen as a limitation as this factor may have made it difficult for students to predict their performance even when presented with examples and verbal explanations of the tasks. Conversely, this aspect may also be considered a strength too, in that prediction of a relatively novel task might provide the most accurate measure of the students' tendencies to under- or over-predict their performance (Klassen, 2007). A major

limitation of the reading task was the amount of time given to complete the task. Although the tasks were piloted with three junior high school students prior to their administration in the schools, it seems that the reading rate of the pilot students was not indicative of the general population. Using these students as a reference, a time limit of three minutes was set. This amount of time proved to be much too generous for the participants in the present study, providing even the weakest students with ample time to complete a greater number of items than expected. Thus, it is suggested that the results achieved on this measure be interpreted with caution, as they may not be a true representation of performance calibration in reading among adolescents with and without LD. In addition, future research will need to use a more challenging task in which a ceiling effect is not at play.

An additional limitation emerged from student comments about the writing task. It is possible that the students' frustration about writing with time pressures may have been detrimental to their performance, negatively impacting the number of items correctly completed due to a fixation on the imbalance between their thoughts and motor skills.

Further limitations of this study can be seen in the lack of control of any previous experience with a ball toss task or visual acuity of the participants. It is certainly possible that some of the participants were more skilled at tasks involving ball throwing (e.g., those who play baseball, softball, or football). Additionally, participants with impaired or reduced vision may be at a disadvantage when performing the ball toss task in this study despite wearing glasses or contact lenses to improve vision. Future researchers should

control for these variables by designing a pre-test of this skill or asking for self-report of previous experience in this area as well as using a standard visual acuity test.

Chapter 6

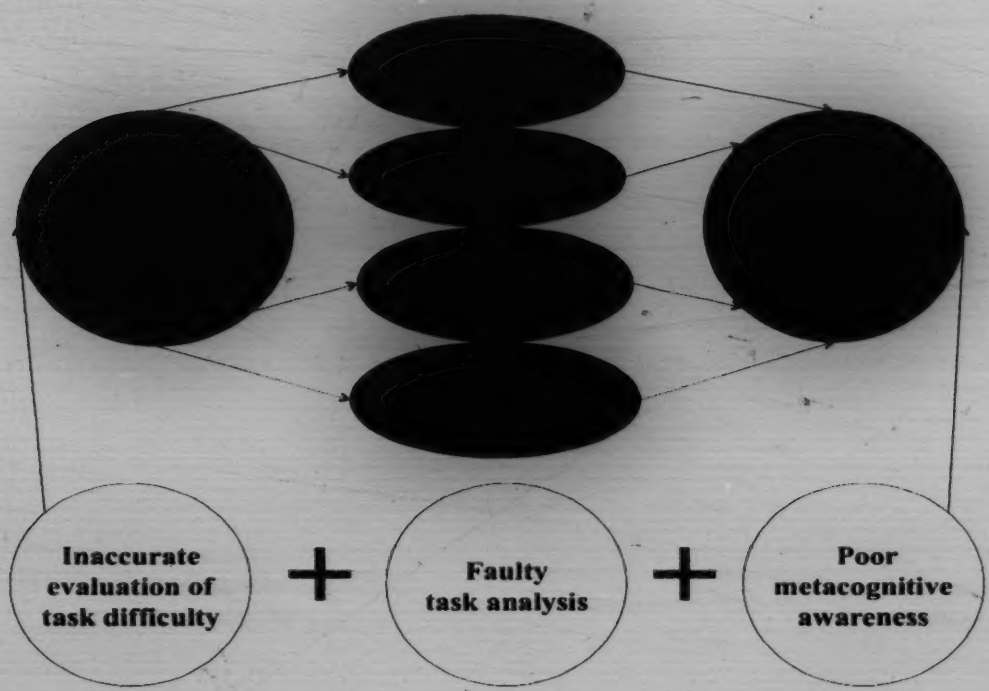
Conclusion

Implications for Theory and Research

Results from this study raise a number of implications for theory and practice. First, various researchers have noted the need to explore the generality of self-efficacy so as to increase its practical utility (Multon, Brown, & Lent, 1991; Pajares, 2002). As demonstrated by the current study, beliefs of personal efficacy among adolescents with and without LD not only transfer across domains, but they can have a tremendous impact on the performance calibration of both declarative and perceptual-motor tasks. Among adolescents with LD, this impact has been shown to be largely negative as overly optimistic efficacy beliefs combined with a lack of metacognitive awareness of skill deficits and task demands often lead to performance miscalibration. Additionally, this miscalibration of performance has been demonstrated to be even greater given increases in task difficulty (see Figure 3). Understanding the conditions and contexts under which self-beliefs of adolescents with LD will generalize to differing academic and non-academic activities offers valuable possibilities for intervention and instructional strategies that may help students build both competence and the necessary accompanying self-perceptions of competence to accurately calibrate performance and achieve success.

The second implication of this study relates to an increased understanding of the importance of developing accurate and realistic self-efficacy beliefs. Although the most functional efficacy judgments are those that slightly exceed what one can actually accomplish, results from this study and other research shows that a high degree of overestimation may actually be maladaptive (Alvarez & Adelman, 1986; Graham et al.,

Figure 3. Proposed model of the factors contributing to the continuation of overly optimistic self-efficacy beliefs and performance miscalibration in adolescents with LD



1992; Graham et al., 1993; Klassen, 2002, 2007; Pintrich et al., 1994). Rather than focusing on lowering a student's efficacy beliefs, teachers and parents should focus on improving calibration skills through improved task understanding and thorough preparation, thus bringing about greater congruence between efficacy beliefs and performance. Moreover, teaching students with LD to consistently evaluate their performance and adjust metacognitions based on task outcome may help improve calibration across domains and allow these students to obtain a more accurate view of their abilities (Pajares, 2002).

An important implication from the present research study stems from the finding that ability overestimation and subsequent performance miscalibration in students with LD appears to be pervasive, and occurs not only in the academic domain, but transfers to non-academic tasks. Although this discovery has significant implications for the construct of LD, further research in this area is needed to clarify the generalizability of factors contributing to performance miscalibration, including self-efficacy beliefs, metacognitive awareness, and self-regulatory strategies. Ultimately, the goal of research in self-efficacy is to ameliorate student performance; therefore, it will be important to examine whether enhancing the accuracy of efficacy beliefs and improving analysis of task demands and difficulty has a positive effect on performance calibration in both academic and non-academic contexts.

Of equal interest is the finding that adolescents with LD seem to become less accurate in their performance evaluations as task difficulty increases. On the throwing task, students with LD displayed greater performance miscalibration as the distance between the starting line and target increased. The above results have important implications for the learning and instruction of students with LD. If adolescents with LD experience greater challenge judging their performance on a throwing task as the difficulty increases, it is plausible to suggest that they might experience this same pattern of poor performance and ability overestimation on academic and vocational tasks of increasing difficulty. As adolescents with LD continue in school and enter the workforce, they will be faced with increasingly demanding curriculum and tasks requiring the use of metacognitive skills and strategies. Students with LD may encounter difficulties and frustration with these more complex tasks if metacognitive skills are not well developed

and if they do not develop the techniques necessary to plan, monitor, and evaluate performance.

Implications for Practice

Findings from this study suggest that there are many ways that specialist teachers can help students with LD improve their self-perceptions and performance calibration. One suggestion is to ensure that students acquire metacognitive awareness and self-regulation strategies through explicit instruction, discussion, modeling, feedback, and practice (McCrudden et al., 2005; Paris & Oka, 1989; Schunk & Zimmerman, 2007; Schunk, 2003; Van Keer & Verhaeghe, 2005). It would be beneficial for teachers to incorporate self-evaluation strategies along with their introduction of the task to be completed, so that students with difficulties may learn how and when to apply them (Schunk & Zimmerman, 2007).

Teachers can develop student goal setting and self-evaluation skills in students with LD. As has been demonstrated, adolescents with LD are often poor goal setters at the outset of a learning task. Therefore, direct instruction may be necessary until these students can set realistic goals for themselves (Schunk & Zimmerman, 2007). Teachers must also understand that learning a novel task can be a very slow and frustrating process and that it is important to keep students motivated and on task. When students with LD are successful as a result of hard work and effective strategy use, they may learn to value these strategies and feel empowered to work hard, recognizing that persistence can lead to success. Thus, they are motivated to expend effort and persist in the face of difficulties (Meltzer et al., 2004).

Another important application is for teachers to realize the importance of maintaining positive motivational beliefs when achievement is low. Few activities are without some positive component, thus it is imperative to teach students to review past performances with recognition of both assets and deficits (Klassen & Lynch, 2007). Additionally, teachers should be mindful of the way in which they offer feedback to adolescents with LD as providing support promptly could be interpreted as an indicator of perceived low ability or failure (Klassen & Lynch, 2007). Students with LD who exhibit hesitancy toward the practice of self-evaluation may benefit from guidance and direction that builds self-awareness, with frequent provision of praise for effort and demonstration of initiative (Klassen & Lynch, 2007).

An additional classroom application relates to the building of student self-efficacy by having adolescents experience successful learning situations, allowing them to see successful models, and providing encouragement validated by success (Schunk, 2003; Schunk & Zimmerman, 2007). Although social persuasions and vicarious experience do not achieve the same results as achieving personal success in real situations, they can still be effective (Schunk, 2003; Schunk & Zimmerman, 2007). This is especially true when it comes to peer modeling. When students perceive peer models as similar to themselves, they are more apt to feel efficacious for learning (Schunk & Zimmerman, 2003). Additionally, self-efficacy scales may prove to be of great use to teachers of students with LD. For example, conducting an assessment of efficacy beliefs prior to beginning a reading task might provide teachers with insight into the perceptions held by their students as to their reading ability and help identify miscalibrations (Klassen, 2002). In turn, this information may be valuable in aiding in the identification of students whose

overconfidence is interfering with the development of appropriate skills and strategies for effective learning (Klassen, 2002).

Future Directions

Research has demonstrated the importance of enhancing the self-efficacy beliefs of adolescents and improving the metacognitive strategies used for self-regulation of performance in order to increase academic achievement (Chapman & Tunmer, 2003; Klassen, 2002; Mason, 2004; McCabe & Margolis, 2001; Meltzer et al., 2004; Miranda et al., 1997; Nes Ferrara, 2005; Paris & Oka, 1989; Pintrich et al., 1994). However, much work still needs to be done in this area, especially among students with LD.

Adolescents with LD may believe that they are accurate in their predictions of performance, but evidence from recent research suggests these beliefs may be mistaken (e.g., Klassen, 2007). According to Kruger and Dunning (1999), improving individuals' metacognitive awareness enhances the accuracy of self-evaluations and enables individuals to more precisely determine areas of weakness and work to ameliorate functioning wherever possible (Klassen & Lynch, 2007). A lack of metacognitive self-knowledge is a challenging obstacle to overcome in the quest for successful task performance (Butler, 1998), but few investigators have provided specific ways to improve students' metacognitive awareness (Dunning, Heath, & Suls, 2004; Klassen & Lynch, 2007; Kruger & Dunning, 1999, 2002). The task of developing students' metacognitive abilities as a way of improving self-efficacy calibration and performance predictions is difficult and future intervention studies should be designed to investigate the relationship between increased self-awareness, self-efficacy, and performance calibration (Klassen & Lynch, 2007).

Although it is well established that adolescents with LD hold overly optimistic self-efficacy beliefs about their performance on various tasks, little is known about *why* these students consistently overestimate their capabilities. Several hypotheses have been proposed including differential reference groups (Renick & Harter, 1989), poor metacognitive awareness (Slife, Weiss, & Bell, 1985), ego protection (Alvarez & Adelman, 1986), and faulty understanding of task and self (Borkowski, 1992). However, little research has been done to corroborate these suppositions. It is believed that through examination of the hypotheses of previous investigators, future studies may contribute to the literature on this topic by lending support to their conclusions or opening up other avenues for research. For instance, it would be helpful to compare students with LD in self-contained settings to those who are in mainstream settings. Students' ratings of self-efficacy may vary depending on whom they use as their reference group (i.e., LD peers or students without LD). As suggested by Stone and May (2002), students with LD may hold strongly negative views of self in a particular domain, but due to poor metacognitive awareness and a need for self-protection, they continue to overestimate their academic skills and performance in that domain.

Another potentially valuable area for future research would be investigating the specific avenues by which self-views influence performance estimates. There seem to be several possible mechanisms connecting these two variables, independent of actual performance. For example, self-views may potentially serve as an anchor on which adolescents with LD base their performance predictions, outside of which they adjust to take into account any experiences they have had with the task (Ehrlinger & Dunning, 2003). Alternatively, adolescents' self-views may provide an initial hypothesis of how

they might perform on a given task. Since individuals often seek out information that confirms their hypotheses, new information may be interpreted as more supportive of a favored hypothesis than might actually be the case (Russo, Meloy, & Medvec, 1998). Given these varying mechanisms, it is suggested that future research look more closely at the process through which self-views influence performance predictions as this may help to determine appropriate interventions geared at changing these resistant views of self to incorporate performance feedback more readily.

One of the most pertinent issues to be examined in future studies relates to the finding that performance miscalibration among adolescents with LD appears to extend beyond the academic domain. The significant overestimation of self-efficacy beliefs and its negative effect on performance calibration in a non-academic context suggests that the metacognitive difficulties and faulty perceptions of ability transfers across domains, interfering with effective performance calibration and leading to enhanced feelings of frustration and failure. It will be important for upcoming investigations to replicate this finding and lend support to the argument which purports that performance miscalibration in adolescents with LD occurs as a result of pervasive metacognitive bias. Researchers would do well to seek to understand the performance of students with LD across academic and non-academic domains.

Concluding Remarks

The main goal of the current study was to understand the ability overestimation and performance miscalibration among adolescents with LD across domains. It is believed that this objective has been achieved and that the findings serve to launch a new and exciting conversation in the discussion of LD and the factors associated with this

construct. Results unique to the present study relate to the performance miscalibration among adolescents with LD across domains, with overestimation occurring on a task of perceptual-motor ability. This finding is especially important as it suggests the generalizability of performance miscalibration and self-perceptions of competence from one context to another and is in direct opposition to the conventional definition of LD, which holds that persons diagnosed with LD show definite learning deficits in specific domains. Also of considerable value is the finding that performance calibration of adolescents with LD seems to decrease as task difficulty increases. A common theme is that adolescents with LD experience great difficulty with the accurate assessment of task demands and judgment of personal capabilities. In contrast, NA adolescents are more consistent in their ability perceptions and performance calibration across distances and domains.

Adolescents with LD will benefit from learning about the calibration of personal beliefs of efficacy and performance in various domains. Formation of a realistic view of their individual capabilities will allow for more accurate performance calibration, leading to greater academic performance and less feelings of frustration and inadequacy. It is hoped that these successes will translate into increased self-confidence and motivation and have positive effects on the social relationships and emotional well-being of all students.

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Appendix A

Principal Information Form

PERFORMANCE MISCALIBRATION IN ADOLESCENTS WITH LEARNING DISABILITIES: DOMAIN-SPECIFIC OR GENERALIZED TRAIT?

Research Project Overview

Purpose: To explore the accuracy of calibration between perceived self-efficacy beliefs and task outcome (i.e., the accuracy of performance estimates compared to actual performance) of learning-disabled adolescents for judgments made using procedural-oriented stimuli (e.g., throwing a bean bag through a hole on a game board) versus those made using declarative-oriented stimuli (e.g., writing sentences when provided with three words) (Gasser & Tan, 2005; Klassen, 2002).

Significance: This study is designed to investigate whether or not differences arise in the way adolescents with learning disabilities (LD) calibrate their performance on various academic and non-academic tasks compared to their normally-achieving (NA) counterparts. The literature suggests that students with LD frequently *overestimate* their ability to perform well on academic tasks even though past performance dictates otherwise (Alvarez & Adelman, 1986; Graham, MacArthur, Schwartz, & Page-Voth, 1992; Graham, Schwartz, & MacArthur, 1993; Klassen, 2002; Pintrich, Anderman, & Klobucar, 1994). However, it is not yet known whether this same miscalibration of performance among students with LD occurs in non-academic domains. Results from a study investigating confidence calibration for a perceptual-motor task (i.e., throwing darts at a target from varying distances) by Gasser & Tan (2005) suggest that how well an individual believes he will do is a greater predictor of performance than actual skill. Results from the proposed study will contribute to the research literature on the influence of self-efficacy beliefs in performance calibration of adolescents with and without LD.

Method:

Participants: 50 adolescents with LD and 50 NA controls will be recruited from junior high schools in the Edmonton area offering the Strategies program.

Data Collection: The first step in the data collection process will be to contact the Edmonton Public School Board (EPSB) and submit an application to conduct research in the school system.

Upon clearance by EPSB, information regarding the study will be discussed with the principals of each school. Once they have agreed to allow the researcher into their schools, teachers from each of the schools will be sent a one-page synthesis of the project via email outlining the purpose of the study, student involvement, time commitment involved, and benefit for the school and students. Next, students will be recruited via classroom visits by the researcher. All students will be given a participant consent form as well as one to be signed by their parents.

After obtaining student and parent consent, each student will be taken out of his/her class for one 45-minute period to complete three academic tasks. The first is a reading task where the students will be required to read sixty sentences in three minutes and decide whether each sentence is true or false. The second task consists of spelling thirty words of medium difficulty for the students' grade and learning level. The words will be read aloud by the researcher. The third task is a writing task whereby the students will be asked to write short, complete sentences out of three words in five minutes. Items developed for the academic tasks will be based on the Woodcock-Johnson III Tests of Achievement (Woodcock, McGrew, & Mather, 2001). Prior to each task, the student will be asked to rate, in writing, how confident he/she is in his/her ability to complete the task at hand.

The non-academic task consists of tossing a ball at a target (frisbee) from three different distances (i.e., 2m, 3m, and 4m). Prior to the task, the student will be asked to rate, in writing, how confident he/she is in his/her ability to hit the target from each distance. The total time for this task is approximately 5 minutes.

Dissemination of results: A short report (4-5 pages) summarizing the results will be disseminated to the schools, teachers, and families of the students involved. As well, a small presentation of the results will be organized at the participating schools to allow teachers and parents to ask questions of the researcher as well as inform them of this study's contribution to the existing research literature.

Benefits to participants: This project serves to understand the ways in which adolescents with LD calibrate their performance on academic and non-academic tasks. It seeks to provide the participants involved with a greater knowledge of how their self-efficacy beliefs influence their performance and how accurate they are in estimating their performance on various tasks. This, in turn, will hopefully help them view their individual capabilities realistically and allow for more accurate performance calibration.

The classes of the students who participate in the research study will be given a pizza party at the end of the data collection phase.

Benefits to the school and school district: Optimistic estimates of self-efficacy (i.e., an individual's beliefs about his/her own capabilities) are believed to increase effort, motivation, and perseverance, and encourage achievement in challenging situations. In academic contexts, optimistic efficacy beliefs are thought to be essential when adolescents approach novel tasks and are presented with new material. However, there is a point at which optimism may be maladaptive, such as in the case of performance miscalibration of adolescents with LD. Students who are overly optimistic in their abilities tend to be less prepared, set inappropriate academic goals, exhibit poorer self-advocacy skills, and develop less effective self-help strategies. This is extremely maladaptive for adolescents with LD, as effective self-advocacy, appropriate goal setting, and practical self-help techniques have been shown to be essential to their success. Without the proper acquisition of these skills, adolescents with LD will be faced with even greater failure and frustration. Therefore, one of the benefits of this project will be

to provide school personnel, teachers, and parents with the information they need to encourage the confidence of adolescents with LD, while helping them to see the importance of developing optimistic efficacy beliefs that are grounded in knowledge of the material and thorough preparation. Additionally, results from this study will provide the schools and school district with up to date research information on this topic, which may be used to inform special programming in the future.

Appendix B

Teacher Information Form

PERFORMANCE MISCALIBRATION IN ADOLESCENTS WITH LEARNING DISABILITIES: DOMAIN-SPECIFIC OR GENERALIZED TRAIT?

Researcher: Jenelle Job, MEd Student, Email: job@ualberta.ca, Ph: (780) 720-7876

Supervisor: Robert Klassen, PhD, Email: robert.klassen@ualberta.ca, Ph: (780) 492-9170, Fax: (780) 492-1318

Dear Teachers,

I would like to request your help in conducting a research study that explores the accuracy of calibration between perceived self-efficacy beliefs (i.e., the beliefs individuals have about their own capabilities) and task outcome (i.e., the accuracy of performance estimates compared to actual performance) of adolescents with learning disabilities (LD) on both academic and non-academic tasks in comparison to normally-achieving (NA) adolescents.

As a graduate student in the Department of Educational Psychology at the University of Alberta, this research project is being conducted as a requirement for completion of the Master of Education degree in Psychological Studies in Education Professional (School Psychology) Stream, under the supervision of Dr. Robert Klassen.

For this study, I will recruit 50 adolescents with LD and 50 NA controls from junior high schools in the Edmonton area offering the Strategies program. Each Strategies student will be matched in terms of age, grade, and sex to a NA peer from his/her school.

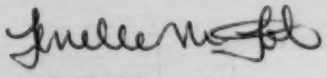
After obtaining student and parent consent, each student will be taken out of his/her class for one 45-minute period to complete three academic (i.e., reading and answering true or false questions, spelling words of medium difficulty read aloud, and writing sentences out of three words) and one non-academic (i.e., beanbag tosses through a hole in a game board at varying distances) tasks. The classes of the students who participate in the research study will be given a pizza party at the end of the data collection phase.

To start this project, I will be asking you to send home a consent form to parents outlining the project and asking for permission for their child to participate. After these forms are collected, I will begin scheduling convenient times for the students to leave the classroom to complete the tasks.

Benefits to the school include updated research-based information about the role self-efficacy belief play in the calibration of student performance on academic and non-academic tasks. Benefits to the students include providing them with a greater knowledge of how their self-efficacy beliefs influence their performance and how accurate they are

in estimating their performance on various tasks. This, in turn, will hopefully help them view their individual capabilities realistically and allow for more accurate performance calibration. A short report (4-5 pages) summarizing the results will be disseminated to the schools, teachers, and families of the students involved. The results from this study will likely be presented at academic conferences and published in research journals.

Thank you for your cooperation,



Jenelle M. Job
MEd Student
Educational Psychology
University of Alberta

Appendix C

Parent/Guardian Consent Form

PERFORMANCE MISCALIBRATION IN ADOLESCENTS WITH LEARNING DISABILITIES: DOMAIN-SPECIFIC OR GENERALIZED TRAIT?

Dear Parent/Guardian,

Your son/daughter's school has been selected to participate in a research project investigating the performance calibration and self-efficacy beliefs (i.e., the beliefs individuals have about their own capabilities) of adolescents with and without learning disabilities (LD) on academic and non-academic tasks. I am writing to request your consent to allow your child to participate in this study.

As a graduate student in the Department of Educational Psychology at the University of Alberta, this research project is being conducted as a requirement for completion of the Master of Education degree in Psychological Studies in Education Professional (School Psychology) Stream, under the supervision of Dr. Robert Klassen.

If your son/daughter participates in this project, he/she will be taken out of his/her class for one 45-minute period to complete three academic tasks (i.e., reading and answering true or false questions, spelling words of medium difficulty read aloud, and writing sentences out of three words). All students participating in the project will complete these tasks in a separate classroom at the same time so as to minimize class disruptions. Additionally, your son/daughter will be asked to complete one 5-minute non-academic (i.e., ball toss at a target from varying distances) task that will take place in a one-on-one setting with the researcher. After school sessions will take place within the first hour after classes have ended for the day. The classes of the students who participate in the research study will be given a pizza party at the end of the data collection phase.

Only the researcher and supervisor will have access to the raw data collected in the project. The names of your child, the school he/she attends, and his/her teachers will not appear in any reports of this study. Participants will be guaranteed anonymity and will be identified by code number rather than by name. Your child's participation is completely voluntary and he/she has the right to withdraw at any time without penalty. The data collected will be kept in a secured storage area after the study is completed.

Benefits to the school include updated research-based information about the role self-efficacy belief play in the calibration of student performance on academic and non-academic tasks. Benefits to the students include providing them with a greater knowledge of how their self-efficacy beliefs influence their performance and how accurate they are in estimating their performance on various tasks. This, in turn, will hopefully help them view their individual capabilities realistically and allow for more accurate performance calibration.

At the end of the study, a short report (4-5 pages) summarizing the results will be disseminated to the schools, teachers, and families of the students involved. The results from this study will likely be presented at academic conferences and published in research journals.

> "The plan for this study has been reviewed for its adherence to ethical guidelines and approved by the Faculties of Education, Extension and Augustana Research Ethics Board (EEA REB) at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Chair of the EEA REB at (780) 492-3751. You may also call Dr. Robin Everall, Chair, Department of Educational Psychology at (780) 492-2389."

Thank you for your consideration of this project. Should you have any questions, please do not hesitate to contact me using the information provided below.

Respectfully yours,

Jenelle M. Job
MEd Student
Educational Psychology
University of Alberta

Email: job@ualberta.ca
Ph: (780) 720-7876

Supervisor: Robert Klassen, PhD, Email: robert.klassen@ualberta.ca, Ph: (780) 492-9170, Fax: (780) 492-1318

Please check one of the two following options:

_____ I DO give permission for my child _____ (name of child) to participate in the research project described above.

Child's date of birth: _____ (DD/MM/YYYY)

Child's grade: _____

_____ I DO NOT give permission for my child _____ (Name of child) to participate in the research project described above.

Parent's name (please print): _____

Parent's signature: _____

Date: _____, 2008.

Appendix D

Participant Consent Form

PERFORMANCE MISCALIBRATION IN ADOLESCENTS WITH LEARNING DISABILITIES: DOMAIN-SPECIFIC OR GENERALIZED TRAIT?

This is to state that I agree to participate in a program of research being conducted by Jenelle Job of the Department of Educational Psychology at the University of Alberta as a requirement for completion of the Master of Education degree in Psychological Studies in Education Professional (School Psychology) Stream, under the supervision of Dr. Robert Klassen.

PURPOSE

I have been informed that the purpose of this research is to study the self-efficacy beliefs and performance calibration of adolescents with and without learning disabilities (LD) on academic and non-academic tasks.

PROCEDURES

I have been informed that this study will take place at my school during school hours in a classroom set up by the researcher and my principal.

Academic Tasks

I have been informed that I will be asked to complete three academic tasks. The first is a reading task where I will be required to read sixty sentences in three minutes and answer whether I believe each sentence is true or false. The second task is a spelling task, which consists of thirty spelling words of medium difficulty for my grade level. The words will be read aloud to me by the researcher. The third task is a writing task where I am asked to write thirty short, complete sentences out of three words in five minutes. Prior to each task, I will be asked to rate in writing how confident I am that I will be able to complete the task. The total time for these tasks will be approximately 45 minutes.

Non-Academic Task

I have been informed that I will be asked to complete one non-academic task. This task consists of tossing beanbags through a hole on a game board from three different distances (i.e., 2m, 3m, and 4m). Prior to the task, I will be asked to rate in writing how confident I am that I will be able to throw the beanbag through the target hole from each distance. The total time for these tasks is approximately 5 minutes.

CONDITIONS OF PARTICIPATION

1. I understand that I may decline to participate in the experiment without negative consequences.
2. I understand that I am free to withdraw my consent and discontinue my participation at any time without negative consequences.

3. I understand that my participation in this study is confidential (i.e., the research investigator and supervisor will know but will not disclose my identity).
4. I understand that the data from this study may be published or presented at a scientific conference; data will be reported in a way that protects each participant's identity
5. I understand the purpose of this study and know that there is no hidden motive of which I have not been informed.
6. My classmates and I will be given a pizza day upon completion of our participation.
7. I understand that my family and I will receive a summary of the final research report when the study has been completed.
8. I may have a copy of this agreement.

"The plan for this study has been reviewed for its adherence to ethical guidelines and approved by the Faculties of Education, Extension and Augustana Research Ethics Board (EEA REB) at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Chair of the EEA REB at (780) 492-3751. You may also call Dr. Robin Everall, Chair, Department of Educational Psychology at 780-492-2389."

I HAVE READ THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND AGREE TO PARTICIPATE IN THIS STUDY.

Participant's name: (please print): _____

Participant's signature: _____

Researcher's signature: _____

Date: _____, 2008.

Appendix E

READING

I'm going to ask you to read 60 sentences in 3 minutes that may or may not be true. You will circle either T or F depending if you believe the item is true or false.

Here are a few examples:

1. Elephants are small animals.....T F
2. A scientist may work in a laboratory.....T F
3. A bag filled with feathers would be very light.....T F

Before we begin, please rate your degree of confidence of getting 30% (18 items correct out of 60) to 100% (60 items correct out of 60) correct by circling a number to the right of each of the percentages:

	Cannot do at all					Maybe can do					Certainly can do
30% correct	0	1	2	3	4	5	6	7	8	9	10
40% correct	0	1	2	3	4	5	6	7	8	9	10
50% correct	0	1	2	3	4	5	6	7	8	9	10
60% correct	0	1	2	3	4	5	6	7	8	9	10
70% correct	0	1	2	3	4	5	6	7	8	9	10
80% correct	0	1	2	3	4	5	6	7	8	9	10
90% correct	0	1	2	3	4	5	6	7	8	9	10
100% correct	0	1	2	3	4	5	6	7	8	9	10

Prediction: I believe I can correctly answer _____ out of 60 sentences in 3 minutes.

Reading Items

Start time: _____ End time: _____

1. A book has two covers.....T F
2. Spiders have ten legs..... T F
3. Canada is a country..... T F
4. Friday is a month of the year..... T F
5. People often eat with a knife and a pencil..... T F
6. Music can be heard from a refrigerator..... T F
7. Some bikes have three wheels..... T F
8. A plastic plate will break if dropped on the floor..... T F
9. A girl may wear a dress to a party..... T F
10. Trees lose their leaves in the summer..... T F
11. Dice have six sides..... T F
12. Swimming pools are always filled with rubber balls..... T F
13. Pigs like to roll around in the ocean..... T F
14. An umbrella may keep the rain off your head..... T F
15. A doctor is usually hired to mow your lawn..... T F
16. Popcorn is poisonous for most people..... T F
17. Libraries are good places to buy groceries..... T F
18. You can find an acrobat in some circuses..... T F
19. May is the month before April..... T F
20. Hockey rinks are made of grass..... T F

21. Some boys have brown hair and blue eyes..... T F

22. Alligators have very dull teeth..... T F

23. A fan keeps you warm in the winter..... T F

24. Some families have three children..... T F

25. Apples usually grow out of the ground..... T F

26. Dentists will help you with problems with your ears..... T F

27. A plumber may fix a toilet that is broken..... T F

28. The letter "Z" is the first letter of the alphabet..... T F

29. Some people carry money in their pockets..... T F

30. A television is used to cook food..... T F

31. Different types of rides can be found at an amusement park..... T F

32. Eating cotton candy is good for your teeth..... T F

33. Most people wear seatbelts in their cars for safety..... T F

34. You can call a pilot for help if you are in trouble..... T F

35. You play basketball with a stick and a puck..... T F

36. Some people like to sail a boat on a lake..... T F

37. Cowboys ride cows at the rodeo..... T F

38. A guitar is a type of musical instrument you play with your toes..... T F

39. Both apples and oranges can be used to make juice..... T F

40. Most people cover themselves with sand before sleeping..... T F

41. A child may enjoy playing a game of tag at the park..... T F

42. An adult may purchase a vehicle that is for sale..... T F

43. Caterpillars form cocoons to turn into birds..... T F

44. People can light a match with a candle..... T F

45. All children are the same height and weight..... T F

46. Encyclopedias can be found at the public library..... T F

47. A lion usually eats sandwiches when he is hungry..... T F

48. A golden retriever is a type of dinosaur..... T F

49. Some adults lose their hair when they get older..... T F

50. People usually sing when they are sad..... T F

51. Zebras have black and white stripes..... T F

52. Kangaroos carry their babies on their backs..... T F

53. Christmas is a holiday in July..... T F

54. People put saddles on their dogs so they can ride them..... T F

55. People wear scarves and hats in the winter..... T F

56. Mickey and Minnie are cartoon cats..... T F

57. Some people like to go to Florida on vacation..... T F

58. A suitcase can be used to hold a hippopotamus..... T F

59. You can buy food at a grocery store..... T F

60. A road you drive your car fast on is called a driveway..... T F

Appendix F

SPELLING

Now, I'm going to ask you to spell 30 words of medium difficulty for your grade level. For example, I might ask you to spell words like cucumber, hornet, or lightning.

Before we begin, please rate your degree of confidence of getting 30% (9 items correct out of 30) to 100% (30 items correct out of 30) correct by circling a number to the right of each of the percentages:

	Cannot do at all					Maybe can do					Certainly can do
30% correct	0	1	2	3	4	5	6	7	8	9	10
40% correct	0	1	2	3	4	5	6	7	8	9	10
50% correct	0	1	2	3	4	5	6	7	8	9	10
60% correct	0	1	2	3	4	5	6	7	8	9	10
70% correct	0	1	2	3	4	5	6	7	8	9	10
80% correct	0	1	2	3	4	5	6	7	8	9	10
90% correct	0	1	2	3	4	5	6	7	8	9	10
100% correct	0	1	2	3	4	5	6	7	8	9	10

Prediction: I believe I can correctly spell _____ out of 30 words.

Spelling Items

Start time: _____ End time: _____

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

21	
22	
23	
24	
25	
26	
27	
28	
29	
30	

Spelling Words

1. Some

   Can I please have some milk?

   Some

2. Read

   The book I read was funny.

   Read

3. Shoe

   If the shoe fits, wear it.

   Shoe

4. Friend

   My friend tells the best jokes.

   Friend

5. Before

   We got along much better before the fight.

   Before

6. Comb

   I bought a new comb at the store.

   Comb

7. Juice

   I always drink orange juice for breakfast.

   Juice

8. Laughing

   She could not stop laughing during the movie.

   Laughing

9. Loose

   My jeans are too loose around my waist.

   Loose

10. Popular

    She was the most popular girl in school.

    Popular

11. Against

    Against all odds, he won the race.

    Against

12. Clothes

    I need to buy new clothes for school.

    Clothes

13. Error

She only made one error on her math test.

Error

14. General

The Army General made the cadets stand at attention.

General

15. Weigh

I weigh more this year than I did last year.

Weigh

16. Doubt

I doubt he will make the basketball team.

Doubt

17. League

The soccer league I play for is non-competitive.

League

18. Bicycle

The red bicycle has ten speeds.

Bicycle

19. Gymnasium

The gymnasium is being used for graduation this year.

Gymnasium

20. Advertisement

I really enjoy that advertisement for laundry detergent.

Advertisement

21. Squirrel

The squirrel ran up the tree with the chestnut.

Squirrel

22. Calendar

A calendar tells the months and days of the year.

Calendar

23. Recommendation

Her boss gave her an excellent recommendation when she left.

Recommendation

24. Negotiate

It was his job to negotiate the contract.

Negotiate

25. Synonym

A synonym for "enormous" is "huge".

Synonym

26. Sufficient

The effort she gave on the exam was sufficient.

Sufficient

27. Chaos

The playground was full of chaos.

Chaos

28. Physicist

A physicist works in a laboratory.

Physicist

29. Exaggerate

Do not exaggerate the story when talking to your teacher.

Exaggerate

30. Anonymous

The author of the poem remained anonymous.

Anonymous

Appendix G

WRITING

Now, I'm going to ask you to write 30 sentences in 5 minutes. You will be given 3 words that you must use to make up short, complete sentences.

Example: *large, dog, barks*
You could write: The large dog barks.

Example: *apples, picked, tree*
You could write: I picked apples from the tree.

Before we begin, please rate your degree of confidence of getting 30% (9 items correct out of 30) to 100% (30 items correct out of 30) correct by circling a number to the right of each of the percentages:

	Cannot do at all					Maybe can do					Certainly can do
30% correct	0	1	2	3	4	5	6	7	8	9	10
40% correct	0	1	2	3	4	5	6	7	8	9	10
50% correct	0	1	2	3	4	5	6	7	8	9	10
60% correct	0	1	2	3	4	5	6	7	8	9	10
70% correct	0	1	2	3	4	5	6	7	8	9	10
80% correct	0	1	2	3	4	5	6	7	8	9	10
90% correct	0	1	2	3	4	5	6	7	8	9	10
100% correct	0	1	2	3	4	5	6	7	8	9	10

Prediction: I believe I can correctly write _____ out of 30 sentences in 5 minutes.

Writing Items

Start time: _____ End time: _____

1. plays, rabbit, with

_____

2. kite, flying, air

_____

3. gift, happy, father

_____

4. car, turning, driveway

_____

5. rock, fast, around

_____

6. coffee, hot, steaming

_____

7. suitcase, clothes, packed

_____

8. for, oven, turkey

_____

9. swimming, sunny, lake

_____

10. concert, when, band

_____

11. sweater, birthday, upset

_____

12. delayed, storm, airplane

_____

13. nervous, actor, audience

_____

14. goal, pass, teammate

_____

15. Hawaii, postcard, vacation

_____

16. children, rain, muddy

_____

17. barking, burglar, dog

_____

18. propeller, helicopter, landing

_____

19. letter, sends, for

_____

20. crying, bicycle, bandage

_____

21. crawl, under, hide

_____

22. dark, sleep, unless

_____

23. hungry, when, puppy

_____

24. rain, bored, house

_____

25. from, holiday, family

_____

26. for, running, thirsty

_____

27. breath, pool, time

_____

28. reading, kindergarten, nap

_____

29. use, essay, punctuation

_____

30. lion, jump, circus

_____

Appendix H

BALL THROW

I'm going to ask you to throw a ball at a target from 3 different distances (i.e., 2m, 3m, 4m). You will be given 1 practice throw and 3 test throws.

Before we begin, please rate your degree of confidence of accurately hitting the target on the first, second, and third throw at each distance by circling a number to the right of each of the distances:

	Cannot Certainly do at all					Maybe can do					
1st throw **2m**	0	1	2	3	4	5	6	7	8	9	10
2nd throw **2m**	0	1	2	3	4	5	6	7	8	9	10
3rd throw **2m**	0	1	2	3	4	5	6	7	8	9	10
1st throw **3m**	0	1	2	3	4	5	6	7	8	9	10
2nd throw **3m**	0	1	2	3	4	5	6	7	8	9	10
3rd throw **3m**	0	1	2	3	4	5	6	7	8	9	10
1st throw **4m**	0	1	2	3	4	5	6	7	8	9	10
2nd throw **4m**	0	1	2	3	4	5	6	7	8	9	10
3rd throw **4m**	0	1	2	3	4	5	6	7	8	9	10

Prediction: I believe I can hit the target _____ out of 3 throws at a distance of **2m**.

Prediction: I believe I can hit the target _____ out of 3 throws at a distance of **3m**.

Prediction: I believe I can hit the target _____ out of 3 throws at a distance of **4m**.

Appendix I

Confidentiality Agreement

PERFORMANCE MISCALIBRATION IN ADOLESCENTS WITH LEARNING DISABILITIES: DOMAIN-SPECIFIC OR GENERALIZED TRAIT?

I, Jenelle Job, the researcher for this project, am responsible for:

1. Recruiting participants and obtaining signed consent from students and parents and/or guardians
2. Collecting the data
3. Completing the data analysis
4. Writing the final report and disseminating the results.

I agree to:

1. Keep all the research information shared with me confidential by not discussing or sharing the research information in any form with anyone other than the supervisor, Dr. Robert Klassen.

2. Keep all research information in any form secure while it is in my possession.

3. Return all research information in any form to the supervisor when I have completed the research project.

4. After consulting with the supervisor, erase or destroy all research information in any form regarding this research project that is not returnable to the supervisor (e.g., information stored on a computer hard drive).

5. Other. Specify: _____

Researcher

Jenelle Job

_____	_____	_____
(Print Name)	(Signature)	(Date)

Supervisor

Robert Klassen

_____	_____	_____
(Print Name)	(Signature)	(Date)